

HE  
203  
.A56  
no.  
83-53



U.S. Department of  
Transportation

# Catalog of Transit Station Impact Case Studies

DEPARTMENT OF  
TRANSPORTATION

MAY 22 1984

LIBRARY

August 1983



The cover photo shows the entrance to the Kendall Square Station in Cambridge, Massachusetts. The station is mentioned prominently in the Kingston Trio's recording of the song "MTA."

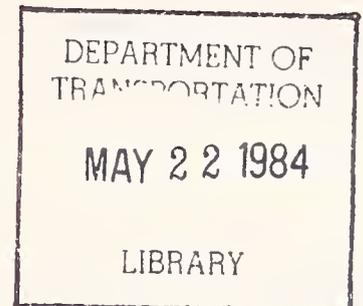
AS2  
20  
2-53

# Catalog of Transit Station Impact Case Studies

---

Final Report  
August 1983

Prepared by  
John A. Page, Meryl A. Mandell,  
Michael J. Demetsky, and Lester A. Hoel  
University of Virginia  
Department of Civil Engineering  
Charlottesville, Virginia 22901



Prepared for  
Office of University Research  
Research and Special Programs Administration  
U.S. Department of Transportation  
Washington, D.C. 20590

In Cooperation with  
Technology Sharing Program  
Office of the Secretary of Transportation

DOT-I-83-53

## EXECUTIVE SUMMARY

### A. Introduction

The public's acceptance of urban and intercity transportation systems is greatly influenced by the negative or positive environmental impacts created by terminals. The transit station itself is a major physical force within a community and can serve to enhance a neighborhood by bringing vitality and activity or to diminish its value by adding congestion, noise and blight.

While the entire community usually achieves overall benefits as a result of the implementation of a major transportation project, such gains are often not realized in certain locations due to disruptions of social and environmental structure. Such conflicts must be resolved and solutions should demonstrate a balance between neighborhood and community values. Furthermore, when public officials examine their options for economic development, transportation terminals offer a unique opportunity to integrate the goals of private sector development, neighborhood enhancement, and community-wide renewal.

### B. Problem Studied

This research considered the design of a public transportation terminal from the perspective of its effect on neighborhoods, urban revitalization, traffic congestion and parking. The effects of terminal facilities on the surrounding environment and the changes that take place when a new or renovated facility is constructed in an area were examined. Emphasis was placed on developing a taxonomy of factors to be used as a guide in assessing the environmental effects of a public transportation terminal.

The objectives of the research program were as follows.

1. To develop an understanding of the impacts on community revitalization and/or decline of public transportation terminal facilities.
2. To identify those elements of a passenger transportation terminal that create impacts on the local land use.
3. To provide a comprehensive definition of those elements within a community affected or influenced by a new transit station.
4. To develop a procedure for assessing the environmental and economic effects of station designs on communities and neighborhoods.

No formal methodology has been documented that provides the passenger terminal planner, the policy maker, or the public with a conceptual overview of the elements involved in the assessment of transportation terminal impacts. This research established a framework and associated data to be used for guiding the generation and evaluation of

alternative transportation terminal exterior facilities and features at a pre-selected site in the system.

The efforts reported here consists of a summary of the present state of knowledge concerning passenger terminal impacts and methods currently in use to evaluate and design for station effects. A set of impact factors related to transit station development is established and related to the associated goals and objectives as seen by the community, the user and the operator.

### C. Results Achieved

The results reported in the document are presented as the Catalog of Transit Station Impact Case Studies. The catalog is an information source of reference as well as a state-of-the-art review of the impact of public transportation terminals on land use and community development. The catalog describes published documents and furnishes a general overview of each with a capsulized sampling of the findings.

For classification purposes, a list of impact descriptor keywords is given. These impact descriptor keywords provide the user with an entry point into a reference catalog. This table provides a quick check of any descriptor in the catalog's overall classification framework. When a keyword is selected, the user is directed to the correct catalog topic area. If the user's keywords are not present, the list can be used to suggest similar or related descriptors.

The topical index provides the framework for the indexing in the catalog. Each topic area is a collection of descriptor keywords which are interrelated or closely associated with each other. Some impact descriptors are very specific and are listed as individual topics, while others are quite general and are associated with other impacts, all of which can be grouped into a single topic.

### D. Utilization of Results

The catalog is an invaluable document because it is a collection of relevant references on all elements encompassed in the station impact assessment problem. The enclosed data provides a starting point for analyzing transit station impacts on the community setting. It provides reference material for developing alternatives at a particular station site and enhances the formalized evaluation process. It can be used to replace or supplement local data as the resources of the study require.

### E. Conclusions

The report develops an increased understanding of the complex terminal/land use interface issues. The catalog is an organized reference on all appropriate impact measures. It will aid in the development of organized transit station impact assessment procedures.

## ACKNOWLEDGEMENT

This research study was sponsored by the Research and Special Programs Administration, Office of University Research with the University of Virginia/Charlottesville. The authors wish to thank the technical monitor, Mr. Norman G. Paulhus, Office of Technology and Planning Assistance for providing valuable suggestions and reviews of the project.

## INTRODUCTION

This Catalog of Impact Assessments is an information source of reference as well as a "state of the art" paper on the impact of public transportation terminals on land use and community development. The catalog describes 250 documents with a general overview of each document referenced and gives a capsulized sampling of the findings.

A list of impact descriptor keywords (Table 1) was developed for classification purposes. This list was compiled using NCHRP Report 156 as a base and was expanded to include as many impact descriptors as needed. The impact descriptor keywords provide the user an entry point for the reference catalog. This table is designed to provide a quick check for the inclusion of any descriptor in the catalog's overall classification framework. If the user's keyword is included, Table 1 will direct the user to the correct catalog topic area. If the user's keyword is not present, Table 1 is used to suggest similar or related descriptors.

The topical index (Table 2) provides the framework for the catalog. Each topic area is a collection of descriptor keywords which are inter-related or closely associated with each other. Some impact descriptors are very specific and therefore are listed as individual topics, while others are very general and are associated with other impacts all of which can be grouped into a single topic. Each major topic is listed in Table 2 with the descriptors included in that topic and the number of references presented in that topic area. The catalog user can determine the correct catalog topic area, the location of that topic in the catalog and the number of references included in that topic by referring to Table 2.

TABLE 1  
Index of Descriptors

Accessibility	Modal Coordination
Accidents (see Safety)	Neighborhood Character
Aesthetics	Noise Pollution
Air Pollution	Operating Cost
Assessments (see Property Values)	Open Space
Attitudes	(see Institutional Land Use)
(see Citizen Participation)	Opinions
Capital Cost (see Economic Impacts)	(see Citizen Participation)
Citizen Participation	Orientation (see Aesthetics)
Commercial Development	Parking
Community Cost (see Social Impacts)	Parks (see Institutional Land Use)
Congestion	Passenger Volumes
Construction Impacts	Pedestrian
Crime	Population
Development Opportunity	Property Values
(see Joint Development)	Psychological Effects
Disadvantaged Mobility	Public Policy (see Infrastructure)
Displacement Cost	Recreation (see Institutional Land
see Construction Impacts)	Relocation (see Construction Impacts)
Drainage (see Erosion)	Residential Land Use
Dust (see Air Pollution)	Retail Sales (see Economic Impacts)
Economic Impacts	Revenues (see Property Values)
Education Institutions	Safety
(see Institutional Land Use)	Shopping (see Commercial Development)
Employment	Social Impacts
Energy	Speculation
Environmental Impacts	Subsidy (see Economic Impacts)
Erosion	Taxes (see Property Values)
Fares (see User Costs)	Terminal Location Data
Financial Impacts	Traffic/Terminal Area (see Congestion)
Goal Assessment	Travel Impacts
Housing (see Residential Land Use)	Trip Length (see Travel Impacts)
Image (see Citizen Participation)	Trip Reliability/Comfort/Convenience
Infrastructure	(see Level of Service)
Institutional Land Use	User Characteristics
Joint Development	User Cost
Landscaping (see Aesthetics)	Value Capture
Level of Service	Vehicle Volumes (see Passenger Volumes)
Lifestyle (see Social Impacts)	Water Pollution (see Erosion)
Lighting (see Aesthetics)	Wildlife and Vegetation Impacts
Location Theory	Zoning
(see Terminal Location)	

TABLE 2  
Topics Index

Page

<u>Accessibility</u>	(7)*
<u>Aesthetics</u>	(7) landscaping, lighting, visual barriers, orientation, psychological effects.
<u>Air Pollution</u>	(7) dust
<u>Citizen Participation</u>	(6) attitudes, goals, images, opinions
<u>Commercial Development</u>	(11) retail sales, shopping
<u>Congestion</u>	(6) traffic around station
<u>Construction Impacts</u>	(10) displacement cost, relocation, R-O-W
<u>Crime</u>	(3)
<u>Disadvantaged Mobility</u>	(3)
<u>Economic Impacts</u>	(20) budgets, capital costs, capital programs, financial subsidies
<u>Employment</u>	(7) jobs
<u>Energy</u>	(8) power demands
<u>Environmental Impacts</u>	(16)
<u>Erosion</u>	(4) drainage, hydrology, water pollution
<u>Infrastructure</u>	(17) public policy
<u>Institutional Land Use</u>	(6) education, public service, parks, recreational
<u>Joint Development</u>	(17) development opportunity
<u>Level of Service</u>	(7) trip reliability and comfort and convenience
<u>Modal Coordination</u>	(4)
<u>Neighborhood Character</u>	(5) cohesion/stability
<u>Noise Pollution</u>	(5)
<u>Operating Cost</u>	(8) maintenance, operating cost comparison
<u>Parking</u>	(6)
<u>Passenger Volumes</u>	(8) user volumes, vehicle volumes
<u>Pedestrian</u>	(5)
<u>Population</u>	(3)
<u>Property Values</u>	(16) assessments, mortgages, rent, revenues, taxes
<u>Residential Land Use</u>	(12) housing
<u>Safety</u>	(4) accidents
<u>Social Impacts</u>	(14) community cost, neighborhood cost, life style
<u>Speculation</u>	(4)
<u>Terminal Location</u>	(11) location theory
<u>Travel Time</u>	(8) travel length
<u>User Characteristics</u>	(7)
<u>User Cost</u>	(6) fares, freight
<u>Value Capture</u>	(4)
<u>Wildlife/Vegetation Impacts</u>	(2) balance of nature
<u>Zoning</u>	(4)

\* ( ) indicates the number of references included in the topic.

## ILLUSTRATIVE EXAMPLE

The following example illustrates how a typical impact is represented in the catalog. Consider the case of a user who desires information on the development potential of sites adjacent to a public transportation terminal. An appropriate impact descriptor is development potential. The associated keyword from Table 1 is Development Opportunity (Joint Development). The Topic Index, Table 2, states that there are 16 references in the Joint Development section and that the location of that topic is page of the catalog. One of these references is shown in Figure 1.

FIGURE 1  
Typical Catalog Listing

\_\_\_\_\_, Joint Development: Making the Real Estate Transit Connection, The Urban Land Institute, Washington, D. C., 1979. Available: The Urban Land Institute.

The report presents the joint development concept through several case studies of five areas. It is aimed at local officials, developers, and citizens for a view of how the joint development concept can be translated into practical, successful projects.

#### Methodology

1. Case studies were presented showing examples of major joint development projects.

#### Findings

- o Private developers are most attracted to sites with appropriate zoning regulations and minimal institutional interaction.
- o Site locations that minimize construction problems and maximize pedestrian flow and commercial potential are preferred by private developers.
- o The availability of unencumbered sites ready for immediate use by developers are preferable.
- o Station entrances should be available to sites with the greatest developmental potential.
- o The cost of the project is extremely important to the developer.

The initial data is a reference bibliography followed by the source for that reference. A listing of the full address for the supplier of the reference is presented in the catalog appendix. The next item in the catalog listing is a general annotation of the entire reference. This is followed by a specific statement relative to the topic describing the methods used to collect or determine the information in the reference. In this example the method used is a collection of case studies. The concluding item is a statement of the major findings of the reference as it applies to the topic area.

Catalog of ReferencesACCESSIBILITY

\_\_\_\_\_, "Accessibility Mapping," John Blayney Associates, David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, San Francisco, CA, 1977.

Auto access times to selected BART stations are mapped and compared with the frequency distribution of travel times to BART reported in the Passenger Profile Survey. The maps and accessibility measures were used in analyzing BART's effects on office construction and the housing industry, workplace and residence location decisions, retail sales trends, property values and rents, and other facets of urban development.

\* \* \* \* \*

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

Methodology

1. Comparison of areawide travel times by transit zones for BART and no-BART alternatives.
2. Changes in accessibility and mobility to selected employment and shopping centers from all other zones.
3. Changes in households' accessibility and mobility from selected communities to major work sites.

Findings

Travel by automobile is faster for most trips, therefore BART has not had a large impact on land use patterns.

\* \* \* \* \*

## ACCESSIBILITY

---

, Environmental Assessment Handbook: Social Impacts, Skidmore, Owings and Merrill, U.S. DOT, WASHINGTON, D. C., 1975. Available: U.S. Government Printing Office.

The social impacts relating to the transportation planning process are discussed under the topics of community cohesion, accessibility of facilities and services, and the displacement of people.

Findings

The assessment of accessibility impacts at the localized level is important during planning phase when identifying specific corridors. Various formulas have been developed to identify and compare areas of pedestrian dependency. The impacts of a major regional project on the area accessibility is developed using isochronal mapping and comparative graph procedures.

\* \* \* \* \*

---

, Joint Development: Making the Real Estate Transit Connection, The Urban Land Institute, Washington, D. C., 1979. Available: The Urban Land Institute.

The report presents the joint development concept through several case studies of five areas. It is aimed at local officials, developers, and citizens for a view of how the joint development concept can be translated into practical, successful projects.

Findings

The station location and access considerations influence the cost of joint development, the potential for cost sharing in construction, and the configuration of the development to enhance pedestrian traffic and the commercial value of the project.

\* \* \* \* \*

Paaswell, Robert, "Working Paper No. 2: Joint Development and the Interaction of Transportation and Urban Form," Transportation and Societal Systems Group, State University of New York at Buffalo, August 1978.

The focus centers on the economic/investment aspect of transportation projects and its relationships with the land use/transportation interaction phenomenon. The difficulty of introducing an economic investment variable into relevant models are examined. Supplementary policies to enforce and direct the operation of transportation investments is included.

Findings

The traditional components of land use/transportation planning are specific infrastructure and accessibility values. These relationships have been demonstrated in the Lowry Models. However, there is a third component in the development process -- economic investment. Thus it is now important to use economic modelling approach to the land use/transportation planning process.

\* \* \* \* \*

## ACCESSIBILITY

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB81-107674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

### Methodology

A model is developed which computes zonal accessibility for work and service trips using travel times and zonal trip productions and attractions. The model was used to rank zonal accessibility for the study area with and without the proposed light rail rapid transit system.

### Findings

- o The zonal accessibility will not change very much due to the construction of the LRRT system. It is likely that the current modal split ratios will change. The residents of zones adjacent to the LRRT system will have an increase in accessibility. The importance of the LRRT system to the CBD is not decrease travel time but to focus attention through increase development.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

## AESTHETICS

, BART in the San Francisco Bay Area: The Final Report of the BART Impact Program, Staff of the Metropolitan Transportation Program, U.S. DOT/U.S. HUD, Berkeley, CA., June 1979. Available: NTIS (PB81-107674)

The final BART Impact Report, develops a program to guide future transportation planning and policy decisions for the Bay Area. The effects of BART on the Bay Area's transportation system and travel behavior, the environment, economics and finance, institution and life styles, land use and urban development, and public policy were assessed.

### Methodology

A survey of residents near the BART facilities was conducted. Also urban design professionals were contacted and asked to evaluate the various components of the BART system relative to the impact on the neighborhood aesthetics.

### Findings

- o A majority of the residents surveyed regarded the BART appearance as an asset to their neighborhood.
- o Urban design professionals judged the BART components to be incompatible in scale with the surrounding residential neighborhoods.
- o Both grouped agreed that landscaping was very important in softening the visual impact of BART.
- o Lighting of the BART stations was viewed as a potential problem by the professionals. However the residents were indifferent to lighting, and many residents felt that the lighting would be helpful in reducing crime and accidents.

\* \* \* \* \*

Carp, Frances M., Theory Background for Study of BART's Impacts on Perception and Response, Metropolitan Transportation Commission, San Francisco, CA., 1976. Available: NTIS (PB 258 368/AS)

A review of behavioral science literature relevant to human perception and response. It outlines a possible strategy for the use of behavioral science theory: a conceptual model of the impact process is suggested which includes the element of human response and its determinates.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage, safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality.

#### Methodology

There is no single best method to assess social impacts. Methods vary due to size, location, project function, neighborhood, magnitude of the impacts, staff time available and costs. The method discussed are: Baseline Data Collection, Surveys, Direct Observations, Diary, Simulation and Hypothetical Proposal.

#### Findings

A proposed development can remove or alter characteristic of the neighborhood. A citizen survey can be used to identify positive and/or negative aesthetic characteristics. If the design of a proposed structure will adversely affect citizen satisfaction then design changes can be sought.

\* \* \* \* \*

, Design for Transportation: National Awards Program by Community Design Exchange, for U. S. DOT and National Endowment for the Arts, Washington, D. C., October 1982. Available: U. S. DOT

The publication presents the 1982 award winners for Passenger Terminal Facilities, Freight Terminals, Bridges and Overpasses, Joint Development Projects, Community Involvement and other similar areas.

\* \* \* \* \*

Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office.

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values, aquatic ecosystems, air quality, noise and vibration.

### Findings

The analyst should be aware of the temporal as well as the spatial dynamics of the features and resources dealt with in the description of environmental design resources. Sources for this data are: published master plans and interview with knowledgeable local experts.

\* \* \* \* \*

Heder, Loyos and Ellen Shoshkes, Aesthetics In Transportation: Guidelines for Incorporating Design Art and Architecture into Transportation Facilities, by Moore-Heder Architects, for U. S. DOT, Washington, D. C. November 1980. Available: U. S. Government Printing Office Stock #050-000-00164-4

The report's purpose is to guide transportation planners, engineers and administrators toward creating attractive environments for the people using transportation facilities and for those in the surrounding communities. It is also intended to provide artists, aesthetic design professionals, and related institutions with information about opportunities that exist in the design of transportation facilities.

### Findings

- o Many transportation facilities are unattractive.
- o Aesthetic is more than "looks." It includes the enjoyment and stimulation that people receive from their experience.
- o Aesthetic design may in some cases cost more than strictly utilitarian approach.
- o Integrated design is an important element in aesthetic quality.

\* \* \* \* \*

## AESTHETICS

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Methodology

On a regional scale, the repetitive visual elements of the BART system were identified and evaluated based on aerial and ground observation and photography. Local visual effects were evaluated in a highly structured manner. Based on land use, building types/density and open spaces, areas along the BART system statopn locations were categorized into local visual setting types.

### Findings

It was found that shadow effects of station structures were insignificant. The study's technical staff evaluation judged BART's station and parking lots to be of incompatible scale where they occurred is low-density residential surroundings, however, most residents found the station architecture to be an asset. BART stations built near existing large structures were judged to complement the existing structure.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

### Methodology

1. A measurement of the attractiveness of development was rated by citizens and "experts."
2. A determination of the percentage of citizens who think the development improves or lessens overall neighborhood attractiveness was collected.

### Findings

A variety of more sophisticated techniques might be used to ascertain aesthetic opinions. But it is unclear whether the added difficulties and expense generally are justified. It should be remembered that people tend to adapt to their environment; once a new development has been in place, people grow accustomed to it.

\* \* \* \* \*



## AIR POLLUTION

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

### Findings

BART cannot have the significant impact anticipated because the system's ridership is minor compared with the total number of trips made in the service area. Direct measurements of the carbon monoxide levels around BART stations show little difference between present levels and those prior to BART operations.

\* \* \* \* \*

, Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office.

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values, aquatic ecosystems,; air quality, noise and vibration.

### Methodology

Two models are discussed in the manual:

1. A mesoscale analysis technique focussing on the entire area that is subject to improvement-related changes in air quality -- SAPOLLUT, ROLLBACK, APRAC-1A.
2. A microscale model that predicts pollutant concentrations at specific locations -- California Line Source, FHWA Technique, HIWAY.

### Findings

- o Roadway, vehicle and land-use related regulatory measures can all be used to improve air quality.
- o Virtually all of the regulatory measures described in this report require multi-agency coordination and/or new legislation.
- o Vehicle-related measures reducing levels of motor vehicle emissions can most directly improve air quality.

\* \* \* \* \*

, Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office, Stock #050-000-00163-6, \$9.00

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

### Findings

In an analysis of benefits presented in the document, the extent that transit can contribute to pollution control is minimal. No conceivable amount of diversion from auto to transit will make much of a dent in the pollution problem, taking into account the limited circumstance under which transit travel is cheaper than private auto, carpools or vanpools.

\* \* \* \* \*

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Methodology

BART's environmental impact on areas adjacent to lines and stations were identified by direct measurement, by review of existing data and interviews with specialists, local officials and BART personnel, by examination of pre-and post construction photography, observations and modeling air quality.

### Findings

- o Dust and dirt during construction of suburban stations was the most mentioned item in the survey of residential areas.
- o BART usage resulted in a three percent reduction in vehicle-miles traveled within the Bay Area. However, this reduction interval had no significant effect on regional air quality.
- o Effects of BART on air quality near stations are minor.

\* \* \* \* \*

Keyes, Dale L., Land Development and the Natural Environment: Estimating Impacts. The Urban Institute, Washington, D. C., 1976. Available: The Urban Institute

The effects of land development on the natural environment are investigated. Both simple manual techniques and complex computerized procedures are examined for estimating land use impacts.

### Methodology

Eight Atmospheric Dispersion Models are discussed highlighting, inputs, outputs, pollutants modeled, sources modeled, computing requirements, cost, accuracy and the model's advantages and disadvantages. The models are as follows: Rollforward, Miller/Holzworth, Hanna/Gifford, California Highway, ERT/MARTIK, TASSIM, CDM, and APRAC.

### Findings

- o Local governments should consider specifying emission "targets" in their land use plans.
- o Where developments exceed target levels, detailed evaluations should be performed.
- o The detailed evaluations should be directed at health aesthetic/nuisance problems.
- o Relative simple yet reasonably accurate techniques are available and should be used.
- o Every model reviewed needs additional validation.

\* \* \* \* \*

Raus, Juri, A method for Estimating Fuel Consumption and Vehicle Emission on Urban Arterials and Networks, U.S. DOT, Washington, D. C., April 1981. Available: NTIS PB82-108523

A method to estimate vehicle fuel consumption and vehicle emission in the urban environment is developed and demonstrated using a sample problem.

### Methodology

The emission data presented is based on U.S. Environmental Protection Agency mobile source emissions factors of 1978 derived from urban driving schedule with average speed of 19.6 mph.

### Findings

It is important to note that the values derived should not be translated directly into air quality measures or applied to pollution standards which depend on many other factors. The purpose of this estimation procedure is to provide the user with some indication as to how the street system is operating in terms of vehicle emission.

\* \* \* \* \*

, Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

#### Methodology

Basically, a three step approach is used.

1. Augmentation of the standard caltrans microscale measurement and prediction approach.
2. Consideration of socioeconomic characteristic within the influence zone.
3. Assessment of impact-perception-response to identify effects.

#### Findings

There are five general approaches by which air quality standard can be achieved:

1. Urban planned to reduce trip length.
2. Rapid transit substitution.
3. Improve control devises
4. Consideration of the environment impacts of new facilities.
5. Traffic regulations and controls.

\* \* \* \* \*

## CITIZEN PARTICIPATION

          , Environmental Assessment Handbook; Volume 3 - Economic Impacts, U.S. DOT, Washington, D. C., 1975. Available: U.S. Government Printing Office. Stock #050-000-00109-1

The transportation planning process is evaluated in terms of its economic impacts. Subject areas covered include employment; income and business activity; residential activity; and the effects on property taxes regional and community plans and growth, and resources.

### Findings

Transportation facilities reinforce land planning and economic development. Also, social and environmental considerations may constrain or limit the possibility of economic growth. Social and environmental goals and objectives are as relevant to any planning process as economic considerations. Transportation alternatives can affect other growth related goals and objectives by providing or limiting accessibility to property.

\* \* \* \* \*

          , "Impacts of BART on the Competitive Advantage and Efficiency of Bay Area Business Operations," McDonald & Grefe, Inc., Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB 237 485/AS)

The report evaluates the economic effects of BART's transportation service on the competitive advantage and efficiency of Bay Area Business operations. The scope of the analysis includes potential economic impacts resulting from improved service and accessibility for workers to jobs. The impact on regional competitive advantage due to location advantage or regional "image," and the possible economic efficiencies associated with BART service.

\* \* \* \* \*

## CITIZEN PARTICIPATION

Jordan, Desoto and others, Effective Citizen Participation in Transportation Planning: Vol. 1, Community Involvement Processes, Vol. 2, A Catalog of Citizen Participation Techniques, Arthur D. Little, Inc., FHWA, Washington, D. C., 1976. Available: NTIS (PB259 981/PB 259 982)

This report serves as a guide for organizing or monitoring citizen participation. It identifies, describes and relates 37 major techniques to the planning process. The techniques are classified by function, information dissemination, information collection, initiative planning, reactive planning, decision making and participation process support. Eight case studies are used to illustrate the techniques.

### Findings

Citizen participation techniques are tools, not just for meeting the federal requirements, but for making plans which reflect the public's desires. The correct use of this techniques should not be an adjunct to the planning process but should be incorporated into every portion of the process. Citizen participation must be as well planned as any other elements of the transportation agency's operation. Citizen participation done poorly can prevent the project from construction or delay the project causing increased cost.

\* \* \* \* \*

, Mass Transit Management: Case Studies of the Metropolitan Atlanta Rapid Transit Authority, University of Georgia, Athens, GA., U.S. DOT, March, 1981. Available: NTIS PB82-148685

Six case studies dealing with various key management oriented events and developments at MARTA are presented. The studies exam public acceptance, fare levels, marketing and contract disputes.

### Findings

Following an over whelming defeat of the MARTA referendum several factors were targeted which were thought to be important if the public was to accept MARTA in the future.

1. Traffic Congestion - "there must be a better way"--transit.
2. Pollution - transit offers a way to reduce concentrations of auto-originated pollutants.
3. Black Community - usually votes in a block, therefore this group should be targeted for educational and advertising efforts.
4. Community Self-Image - transit endorsement by influential leaders as the "winning-image" of Atlanta.
5. Bus Improvement Plan - prior to next referendum the existing bus fleet should be improved to stress the new image of public mass transit.
6. Low Fare - A large factor in attracting the low income voter was the low cost of transit. However, the higher income area viewed the low fare as a giveaway program for the poor.

\* \* \* \* \*

## CITIZEN PARTICIPATION

Schneider, J. B., et al., Planning and Designing a Transit Center Based Transit System: Guidelines and Examples from Case Studies in Twenty-Two Cities, University of Washington, U.S. DOT, Washington, D. C., September 1980. Available: NTIS (PB81-154569)

The transit center concept is examined to determine if and how it might be applied in American cities to provide more efficient and effective transit service on an areawide basis. Present metropolitan travel patterns in American cities are studied, followed by a 10 step planning framework.

### Findings

The growth of U.S. cities are changing the shape of the metropolitan areas. The creation of secondary urban centers located on the fringe of the urban area provides a unique opportunity to change the image of mass transit from fixed route, fixed schedule service to a new pattern serving these new transit demand centers.

\* \* \* \* \*

Schneider, Jerry B., Transit and the Polycentric City, University of Washington, U.S. DOT, Washington, D. C., September 1981. Available: GPO Stock #050-000-00203-9.

Investigated is the role of transit in carrying out regional land use plans aimed at creating major diversified centers in the outer city. The regional planning work in the Twin Cities of Minnesota and other U.S. cities is used to define the polycentric city concept. And evaluation framework is developed and applied.

### Findings

The use of major diversified centers and transit can produce a new and efficient urban form. This concept would reduce travel requirements, conserve energy and reduce air pollution as well as provide an economical area wide transportation system for all sectors of the population.

\* \* \* \* \*

## COMMERCIAL DEVELOPMENT

, A Preliminary Analysis of the Impact of MARTA's Omni Station on Omni International Atlanta, Atlanta Regional Commission, Atlanta, GA, 1981.

A case study of the Omni International Atlanta, a multi-use facility containing office towers, a hotel, a two-level shopping mall, and an entertainment center, was conducted. A comparison was made of conditions prior to and following the opening of rail service to the facility.

### Findings

- o Sixty-one percent of the business surveyed reported increased sales.
- o MARTA benefited certain types of business -- eating and drinking places, recreational facilities and food stores.
- o New shoppers to the Omni are primarily from the suburbs.
- o Large numbers of teenage visitors were attracted to the Omni. Some negative effects including loitering, vandalism, and shoplifting were reported.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

### Methodology

To assess BART's impacts on the region's growth, employment shift in 66 Bay Area industry groups were compared with shifts in comparable industry groups in other major metropolitan areas. The impact of BART on retail sales was assessed by interviewing merchants and shoppers.

### Findings

BART has not attracted new business to the Bay Area. However BART has been a factor in location decision for federal and state offices. BART has had little influence on the location decision of retailers. Retailers in San Francisco perceived bus access more important than BART access. Also the lack of BART Saturday service at the time of the interviews could have influenced the survey.

\* \* \* \* \*

## COMMERCIAL DEVELOPMENT

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage, safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality.

### Methodology

Preparing an impact assessment for shopping the possible measurements are:

- o Changes in number or percentage of households within x minutes of desired shopping facility.
- o Changes in number or percentage of households using facility by type of facility and frequency of use.
- o Changes in other physical conditions affecting household current expressed satisfaction with neighborhood shopping opportunities and number of households potentially affected.

\* \* \* \* \*

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

### Methodology

A computerized data file was created containing information on parcels acquired by BART and CALTRANS, BART relocations assistance, and 1970 census data on tracts traversed by BART. Interviews with a sample of displaced businesses and households were conducted and additional surveys were conducted within the real estate community.

### Findings

During the twenty years prior to BART a major shift in distribution of retail sales from the central city to the suburbs was experienced. A survey of shoppers indicated that a possible shift in shopping patterns favoring the downtown areas was occurring. The survey indicated that BART was used more frequently for shopping for personal items than groceries, furnitures or appliances. Firms selling large or bulky items would not benefit as much from BART as those firms selling smaller items.

\* \* \* \* \*

\_\_\_\_\_, "Impacts of BART on the Competitive Advantage and Efficiency of Bay Area Business Operations," McDonald & Grefe, Inc., Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB 237 485/AS)

The report evaluates the economic effects of BART's transportation service on the competitive advantage and efficiency of Bay Area Business operations. The scope of the analysis includes potential economic impacts resulting from improved service and accessibility for workers to jobs. The impact on regional competitive advantage due to location advantage or regional "image," and the possible economic efficiencies associated with BART service.

\* \* \* \* \*

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB 81-107 674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

#### Findings

Rapid transit improvements might be used as one element of a coordinate package of efforts to revitalize a declining metropolitan area, but should not be relied upon solely or even primarily for such purpose.

#### Retail Analysis

- o People who shopped in downtown did so during the day. However, people who shop in malls shop during the day and evenings.
- o The CBD is most attractive shopping location only to those who live near the CBD.
- o The greatest advantages of CBD shopping are quality and variety of goods. These amenities are perceived as being much greater in the CBD than suburban malls.

\* \* \* \* \*

Paaswell, Robert E., Analysis of Joint Development Projects: Working Paper No. 9 - Retail Attractiveness Models, Department of Civil Engineering, State University of New York at Buffalo, Buffalo, N.Y., April 1980. Available:

Subregional competition in the retail sector must be considered when assessing the impacts of joint development. The role of accessibility and attractiveness are analyzed as a retail model designed to examine the relative pull of various delineated market centers within the region.

#### Methodology

The role of accessibility and attractiveness are analyzed by a retail model designed to examine the relative pull of various market centers within a region. This analysis is provided by examining the impact of specified variables on retail shopping.

#### Findings

Travel cost (time) has no significance in the choice of retail location. The basic attractiveness of the retail location was the prime determinant. Attractiveness components indicate what increases in retail activity must occur to effect the CBD share of the regional market, and what levels of growth on non CBD markets will dampen the impact of CBD development.

\* \* \* \* \*

\_\_\_\_\_, "Retail Sales and Services," John Blayne Associates/David M. Dornbusch & Co., Inc., San Francisco, CA, 1978. Available: NTIS (PB 291 443/OGA)

This study focuses on BART's influence on the distribution and volume of sales in the Bay Area. A shopper survey was concluded, retailers were interviewed and sales tax data were analyzed.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

#### Methodology

Important measure for shopping impact are;

- (1) Change in the number of stores and service, by type, available within (x) distance of (y) people.
- (2) Change in the percent of people generally satisfied with local shopping conditions.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on Local Government Expenditures, Revenues and Financial Policies," Booz, Allen and Hamilton, Inc., 1977.

An assessment of BART's impact on local government expenditures, revenues and financial policies in the Bay Area. The paper includes a comparison of financial trends in Bay Area cities with California cities in general and finding and conclusions on BART's impact on local taxes, expenditures and revenues and financing of local capital improvements projects.

\* \* \* \* \*

\_\_\_\_\_, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, Atlanta, GA, 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of the MARTA rail transit service in the Atlanta Region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

#### Findings

- o Interviews with local office space experts indicate that MARTA rail service has not had a significant effect on locating office buildings in the CBD. Local zoning ordinance have a greater effect on economic development than transit access.

\* \* \* \* \*

## CONGESTION

\_\_\_\_\_, Bus Lanes and Busway Systems, Organization for Economic Cooperation and Development Road Research Department, Paris, France, 1978. Available: O.E.C.D.

The report includes a discussion of local bus lanes accompanied by a representative inventory of bus lanes and accompanying measures in O.E.C.D. member countries. Quantitative and qualitative criteria which must be considered before installing bus lanes are examination. General principles for formulating a balance policy for different priority treatments are presented.

\* \* \* \* \*

\_\_\_\_\_, "Indirect Environmental Impacts," Gruen Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 280 201/AS)

The report documents land development and land use policy changes which have occurred in BART station areas between 1965 and 1975 and assesses the environments impacts associated with development and policy changes near twelve BART stations. In addition, it describes and evaluates changes in station area development of these areas.

\* \* \* \* \*

\_\_\_\_\_, Influence of Measures Designed to Restrict the Use of Certain Transport Modes, European Conference for Ministers of Transport, Paris, France, 1979. Available: O.E.C.D.

Non-financial measures of vehicle use restrictions, such as bus only lanes, limited parking, impeded vehicle access, and altered work schedules, are evaluated. Data generation is based on identifying what analysis is necessary for choosing the alternative measure best satisfying the objectives of restraint.

\* \* \* \* \*

\_\_\_\_\_, Neighborhood Traffic Controls, Urban Consortium for Technology Initiatives, U.S. DOT, Washington, D. C., January 1980. Available: NTIS PB83-110031

Issues and problems related to the wide variety of techniques and devices designed to reduce the value and speed of vehicle movements and to restrict non-resident parking in residential areas are addressed. Included are a list of contacts and current programs, and an annotated bibliography.

\* \* \* \* \*

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on model split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

### Methodology

The focus is on BART's impacts on traffic and travel volumes crossing the San Francisco-Oakland Bay Bridge; and an attempt is made to isolate BART's impacts from the many other factors influencing traffic and travel volumes.

### Findings

- o BART's impact on the Bay Bridge traffic was so small that it was difficult to detect.
- o BART's impact on areawide travel patterns and traffic volumes were undetectable given the many other factors influencing traffic flow.
- o BART's small apparent effect on traffic volumes and congestion stems in part from its lower-than-predicted ridership.
- o New automobile trips have appeared to fill the road space freed by BART ridership.

\* \* \* \* \*

, Transit Impact Monitoring Program: Results of Station Area Studies, Atlanta Regional Commission, Atlanta, GA., August 1981.

Empirical data related to the MARTA rail system was collected and analyzed to describe aspects of station area activity along the East and West Lines, including station patronage, mode of access to MARTA stations, parking in MARTA lots, on street parking, and pedestrian crossings at intersections. The methodology used to collect and analyze the data, along with the findings of the data analysis, are presented in this report.

### Methodology

Observations of users determined access mode by time of day, auto occupancy and parking space turnover rates. Total MARTA systemwide linked and unlinked trips are estimated using Department of Transit Operations data. Passenger boardings and parking lot data were collected daily. Forecast of station patronage are taken from the Atlanta Regional Transportation Planning Process models. All pedestrian data was collected by observations of key intersections by trained personnel.

\* \* \* \* \*

## CONSTRUCTION IMPACTS

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

### Findings

- o The construction of BART resulted in some disruption and inconvenience to residents and business along its rights-of-way, particularly in areas of subway construction.
- o BART's consumption of land and property for lines, stations, and yards was not extensive, and was far less than freeway construction.
- o BART's construction experience demonstrates that advance planning and coordination with local officials can minimize adverse impacts.

\* \* \* \* \*

, "BART's Consumption of Land and Property," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Consumption, San Francisco, CA, 1979. Available: NTIS (PB 287 797/AS)

A document of BART's consumption of land and property occupied by businesses or residents. The relocation process and the development on surplus land acquired by BART is described.

\* \* \* \* \*

## CONSTRUCTION IMPACTS

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

#### Methodology

Key informant interviews provided much of the information used to assess the impacts of BART construction on retail sales and real property.

#### Findings

- o BART's consumption of land and property has not been very disruptive.
- o The most severe impacts occur in the vicinity of cut-and-cover construction.
- o BART's program for obtaining revenues from short-term leases of surplus property has been generally successful.

\* \* \* \* \*

\_\_\_\_\_, "Economic Impacts of BART Capital and Operating Expenditures," McDonald and Grefe, Inc., Metropolitan Transportation Commission, San Francisco, CA., 1978. Available NTIS (PB283 061/AS)

Documents the changes in regional output and employment in the nine-county San Francisco Bay Area which resulted from expenditures from BART's construction and operations. BART's impacts on employment opportunity and on construction wage rates are also evaluated.

\* \* \* \* \*

\_\_\_\_\_, Environmental Assessment Handbook: Social Impacts, U.S. DOT, Washington, D.C., 1975. Available: U.S. Government Printing Office.

The social impacts relating to the transportation planning process are discussed under the topics of community cohesion, accessibility of facilities and services, as well as the displacement of people and businesses.

\* \* \* \* \*

## CONSTRUCTION IMPACTS

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consists of a detailed assessment of BART's current environmental impacts, including direct and indirect impacts and effects on the system's patrons. Assessment was made using technical evaluations and surveys. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Findings

- o Some of BART's construction impacts appear to be more significant than many of the operational impacts.
- o BART's subway construction impacts were substantial and continued for several years despite major efforts to reduce their effects.
- o An analysis of newspaper reports, interviews, BART files and study team observations suggested that BART construction had an adverse impact on traffic safety.
- o The use of retaining walls may have had some negative impact on crime control.
- o Noise effects were minimal in downtown areas.
- o The complete underground utility mapping during BART construction is a major benefit to San Francisco.
- o Artifacts uncovered during construction may have been destroyed.
- o Suburban station and parking lot construction had widespread impacts, but of less severity and duration than those of subway construction.
- o Surveys suggests that noise impacts were perceived in residential areas.
- o Dust and dirt was mentioned as a negative effect of BART construction.
- o Demolition of housing to clear the land for BART parking lots was a source of disruption near suburban stations.
- o Construction of BART's at-grade and aerial trackways was rapid and caused little impact, although nearby residents were disturbed by the effects.
- o Construction impacts were found to depend largely on differences in configuration and setting.
- o BART's most severe construction impacts were around its subway stations and lines, where shoppers and merchants, office workers, and low-income and minority residents were most affected.

, MARTA Residential Displacement and Relocation Activity August 1973 - March 1978, Atlanta Regional Commission, Atlanta, GA, 1979. Staff Working Paper

Findings from a study conducted by the A.R.C staff on relocation activity and residential development resulting from the first phase of MARTA construction are presented. Displaced households representing selected socioeconomic characteristics are identified and evaluated as to the impacts of MARTA construction. Emphasis is placed in quantifiable physical and economic impacts.

\* \* \* \* \*

Pushkarev, Boris and Jeffrey Zupan, Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit, Regional Plan Association, Inc., UMTA U.S. DOT, Washington, C. C., November 19  
Available: NTIS PB82-106907

The study explores what range of travel volume may be sufficient to warrant what type of fixed guideway investment; indicates the location of urban corridors where such travel volumes may be found; offers an estimation of the national market for fixed-guideway facilities and aids in focusing local alternatives analyses on the most promising locations.

#### Methodology

The level of capital construction cost per mile of fixed guideway in 1977 prices, broken down by structural, track and electric and station cost for rapid transit and light rail are presented. These costs are provided for at grade, cut or fill, elevated and underground construction projects. The data are based on a detailed examination of actual construction contracts documents in 14 cities in America and Europe.

#### Findings

##### Averages By Type of Construction

Millions of 1977 dollars per mile of two track guideway.

Rapid Transit	Structure	Track & Electric	1/mile	Total
At grade	3.2	4.2	2.9	10.3
Cut and fill	8.8	4.2	3.9	16.9
Elevated	20.3	4.3	3.2	27.8
Underground	40.3	4.3	7.7	52.2
Light Rail			2/mile	
At grade	2.00	2.90	0.06	4.96
Cut and fill	8.84	3.00	4.78	16.62
Elevated	20.29	3.10	4.35	27.74
Underground	40.23	3.21	6.90	50.34

\* \* \* \* \*

## CONSTRUCTION IMPACTS

\_\_\_\_\_, "Study of BART's Construction Impacts," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, San Francisco, CA, 1978. Available: NTIS (PB 288 653-AS)

An examination of the effects of BART's construction activities on retail sales and services and on real property. Key informant interviews were supplemented by longitudinal data on taxable retail sales and on permits for construction in areas near BART.

\* \* \* \* \*

\_\_\_\_\_, Transit Impact Monitoring Program, 1978 Commercial Land Impacts, Atlanta Regional Commission Regional Development Planning, Atlanta, GA, 1978.

The report provides a brief analyses and summary of MARTA acquisitions of commercial sites from 1974 to 1978, and a station area summary of all commercial property sales that were recorded in the 39 MARTA station areas during the years 1972 to 1974 and over the first six months of 1978.

#### Findings

- o 301 firms were dislocated.
- o 273 firms were dislocated within station areas.
- o An additional 28 firms were dislocated from outside these areas (in the transit corridor).
- o Of the 273, 30% went out of business, 2% moved out of the region, 26% relocated within the same station area, 8% moved to another station area, 34% relocated within the region but outside any station area.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality.

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

#### Findings

- o BART's effect on crime around its stations appear to be minimal. Theft and burglary of automobiles were found to occur on the streets around some stations with parking lots and overflow parking. However, BART patrons were the most frequent victims, and nearby residents do not perceive a threat to themselves.
- o Urban area officials expressed concern about increased crime during night service. However, there has been only a slight increase in arrests, mostly related to intoxication. Violent crime rates remained at a low level.

\* \* \* \* \*

## CRIME

, National Conference on Mass Transit Crime and Vandalism:

Compendium of Proceedings, by New York State Senate Committee on Transportation, for U. S. DOT, Washington, D. C., March 1981. Available: NTIS PB81-185183

This report presents edited reproductions of the speeches made during the conference. The sessions included are: Nature of the Mass Transit Crime Problem, Requirements for Security and Safety on Mass Transit Systems, The Law Enforcement Problem, Public Perceptions of the Mass Transit Crime Problem, Funding Mass Transit Crime Prevention Efforts and Appendices. The appendices contain resolutions adopted and guidelines for future actions.

### Findings

- o The problem is as varied as the communities and transit properties in which it exists.
- o There is no easy solution nor quick cure to the dilemma.
- o Crime exists throughout our cities and mass transit systems because the social ills of poverty, lack of opportunity and despair are ambiguous in present day society.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

### Methodology

The following methods are suggested to monitor crime and fire hazard.

- (1) Change in rates of crime in existing community or new development (or expert rating of change in hazard).
- (2) Change in percent of people feeling a lack of security from crime.
- (3) Change in fire incidence rates.
- (4) Change in rating of fire spread and rescue hazards.

\* \* \* \* \*

, Transit Safety and Security: A Design Framework, Southern California Association of Governments: Criminal Justice Planning Department, Los Angeles, California, 90005. Available: PB 256 518/2ST

The study is an analysis of transit crime data for the Southern California region. It examines safety and security deficiencies in transit design and recommends ways in which they can be ameliorated. The study contains the following:

- 1) Development of security and safety.
- 2) Assessment of crime patterns and safety problems for selected regional transit corridors.
- 3) Examination of the effectiveness of crime prevention by physical design of transit facilities, and
- 4) Development of a reference document for safety and security design criteria in transit facilities. Some specific design areas examined include the following: park-and-ride facilities, parking structures; site planning and landscaping; illumination levels; passenger boarding safety; subway and elevated systems; station visibility; closure and monitoring; traffic and parking criteria; and the special needs of the elderly and handicapped.

\* \* \* \* \*

## DISADVANTAGED MOBILITY

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81 107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

Findings

- o The special needs of transportation disadvantaged persons were not prominent matters of concern during BART's planning period.
- o BART has aided minority and low-income residents of inner cities by encouraging firms to remain centrally located.
- o BART is the mode of travel chosen by minorities roughly in proportions to their incidence in the population of the greater BART service area, but the rate of BART use appears to be lower for Blacks and Spanish-Americans in the smaller area close to BART station.
- o BART is accessible to disabled persons, including persons in wheelchairs.

\* \* \* \* \*

## DISADVANTAGED MOBILITY

Donnelly, Robert and Jesus Arguelles, Implications of BART's Impacts for the Transportation Disadvantaged, Urban Dynamics Associates/U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118 101)

The project examined the implications of the impact of BART on ethnic minorities, elderly and handicapped. Impact areas examined are environmental, mobility economic and land use.

Findings

- o BART's impact on area travel has been far less than was expected.
- o The impact of BART on the mobility of disadvantaged has been small.
- o The minimal effect of BART on improved travel accessibility for lower income groups results from the inability of BART to compete with bus and streetcars relative to out-of-pocket cost and significant travel time savings.
- o Use of BART by the handicapped will probably remain low due to the existence of physical barriers out side of the BART system..
- o BART has had little effect in shifting the regional distribution of economic activities.

\* \* \* \* \*

## ECONOMIC IMPACTS

, A Guide to Innovative Financing Mechanism for Mass Transportation,  
by Rice Center, Houston, Texas, for Office of Planning Assistance,  
UMTA, Washington, D. C. December 1982. Available: Office of  
Technology and Planning Assistance.

The purpose of this technical assistance report is to identify and  
define innovative financial mechanisms which can be utilized by local  
transit leaders and planners to create the financial base necessary to  
the future of public transportation.

\* \* \* \* \*

, "Analyses of BART Capital Costs," Peat, Marwick, Mitchell & Co.,  
Metropolitan Transportation Commission, San Francisco, 1977.  
Available: NTIS (PB 293 855/3GA)

This report documents the components of BART capital cost and  
analyze the difference between the actual \$1.6 billion expenditure  
for BART and the cost forecast of \$994 million in the 1962 planning  
report.

\* \* \* \* \*

, A Preliminary Analysis of the Impact of MARTA's Omni Station on  
Omni International Atlanta, Atlanta Regional Commission, Atlanta, GA,  
1981.

A case study of the Omni International Atlanta, a multi-use facility  
containing office towers, a hotel, a two-level shopping mall, and an  
entertainment center, was conducted. A comparison was made of  
conditions prior to and following the opening of rail service to the  
facility.

#### Findings

- o Sixty-one percent of the business surveyed reported increased sales.
- o MARTA benefited certain types of business eating and drinking places, recreational facilities food stores.
- o New shoppers to the Omni were primarily from the suburbs.
- o Large numbers of teenage visitors were attracted to the Omni. Some negative effects including loitering, vandalism, and shoplifting were reported.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

To assess BART's impacts on the region's growth, employment shift in 66 Bay Area industry groups were compared with shifts in comparable industry groups in other major metropolitan areas. The impact of BART on retail sales was assessed by interviewing merchants and shopper.

#### Findings

BART has not attracted new business to the Bay Area. However, BART has been a factor in location decision for federal and state offices. BART has had little influence on the location decision of retailers. Retailer in San Francisco perceive bus access more important than BART access. Also the lack of BART Saturday service at the time of the interviews could have influenced the survey.

\* \* \* \* \*

Buffington, Jesse L., et al., Non-User Impacts of Different Highway Designs as Measured by Land Use and Land Value Changes, Texas Transportation Institute, College Station, Texas, March 1978. Available: NTIS (PB 288 875/8GA)

This report contains a review of types of higher impacts, impact assessment elements, techniques available to measure land use and land value impacts and the findings of previous studies.

#### Findings

The literature contains impact studies which could be used as "direct" comparables for predicting the land use/or land value impacts of any proposed transportation facility. However, vast majority of impact studies deal with new limited access highways and in most of these studies land use impacts are measured as land value impacts.

\* \* \* \* \*

## ECONOMIC IMPACTS

, Capital Cost, Ridership and Financial Projection: Interim Results, NFTA Metro Construction Division, Buffalo, N.Y., 1978.

Preliminary forecasts for 1985 are presented for the ridership impacts of the proposed light rail transportation system for Buffalo, New York. Study elements include complimentary bus network alternatives, person trip and distribution forecasts, a mode choice model, propose fare policies, bus ridership forecasts, bus operations cost methodologies and expense forecasts, transit operating financial forecasts and interim 1985 station and line segment volume estimates.

\* \* \* \* \*

Donnelly, Paget, Rail Transit Impact Studies: Atlanta, Washington, San Diego, Price, Williams, and Associates, Office of Planning Assistance, U.M.T.A, Washington, D. C., March 1982.

The study assess the change in travel behavior which result from a major transportation system and develops information to aid future investment decisions.

#### Findings

- o As rail systems represent major public investment, the economic impacts of such a system can be significant. However, the amount of this impact has not been determined for Washington, San Diego and Atlanta; these studies are now underway.

\* \* \* \* \*

Dunphy, Robert T., Trends Before Metrorail, Metropolitan Washington Council of Governments and Office of Planning Assistance, UMTA. Washington, D. C., July 1982 Available: Office of Technology and Planning Assistance, U.S. DOT

This report describes trends before the opening of the Metrorail transit system. It summarizes the baseline data for the Metrorail before-and-after study being conducted by the Metropolitan Washington Council of Governments.

#### Findings

- o The area has experienced a decline in retail sales since 1972. The Metrorail will serve 12 major retail centers as well as downtown Washington, all of which may have peaked in sales. It is possible that the principal effect of the Metrorail is to slow the decline or to stabilize sales at the present level. Increased office commercial development at these centers may be the key to long-term retail growth.

\* \* \* \* \*

\_\_\_\_\_, "Economic Impacts of BART Capital and Operating Expenditures,"  
McDonald & Grefe, Inc., Metropolitan Transportation Commission, San  
Francisco, CA., 1978. Available: NTIS (PB 283 061/AS)

Documents the changes in regional output and employment in the Bay Area which results from expenditures for BART's construction and operations. BART's impacts in employment opportunity and on construction wage rates are also evaluated.

\* \* \* \* \*

Graebner, Linda S., Peter B. Giles, The Impact of BART on Public Policy,  
Booz, Allen and Hamilton, Inc., U.S. DOT, Washington, D. C., April  
1979. Available: NTIS (PB81-118119)

Summarizes findings and conclusions of the Public Policy Project and presents policy implications for other metropolitan areas. Impacts of public policy actions are summarized in four areas: organization, finance, land use, and transportation.

#### Findings

- o BART debt burden and tax rate did not influence local tax rate or bonding decisions.
- o BART had a favorable impact on local government finances by providing new sources of financing for public improvement projects.
- o BART didn't attract the necessary ridership to support its operations therefore it requires a local subsidy.
- o Local transit operators seem to have fewer financial resources available than in the no-BART alternative scenario.
- o Local governments can minimize the impact of rapid rail transit on their operating budgets through appropriate agreement with rapid transit officials.

\* \* \* \* \*

## ECONOMIC IMPACTS

Graebner, Linda S., et al., The Local Implications of BART Development, Booz, Allen and Hamilton, Inc., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS PB81 118069

The report assesses whether BART achieved its original objectives of local communities local governmental guidelines are presented to aid in the planning, designing or construction of a transit system. The report is organized into five chapters relating to major areas of local policy: transportation, land use, finance, economic development and environment.

Findings

- o Equity should be an important objective in the financing plan.
- o A truly equitable financing plan can probably not be achieved.
- o Certain financing approaches can help to approach an equitable financing plan.
- o Public officials should develop a strategy to counter public concern about the inequities in the financing plan.
- o Transit financing should have as broad a coverage as possible to minimize potential adverse impacts on local debt.
- o A policy to handle cost to local government resulting from system operations should be developed.
- o Rapid rail transit development will most likely reduce financial resources for other transit services.
- o Transit policy objectives for economic activity should state expected benefits for various groups within the region.
- o A transit-related economic development strategy should include provisions for offsetting the likely economic disadvantages that will result in some areas.
- o The impact of rapid transit expenditures on economic development will increase in direct proportion to the amount spent.
- o Local officials should ensure that the impact of technical decisions on economic development is considered during transit planning.

\* \* \* \* \*

## ECONOMIC IMPACTS

\_\_\_\_\_, Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office. Stock #050-000-00155-5.

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

### Findings

- o Innovative financing techniques represent one of the few untapped sources of funds remaining for transit in this country.
- o Transit beneficiaries frequently extend beyond direct users to neighboring property owners and business served by transit and the general public. Therefore these groups should share in the cost of transit.
- o Innovative financing techniques could realize a higher return on public investment, with benefits beyond urban transportation, e.g. energy conservation, urban re-development, economic growth.

\* \* \* \* \*

\_\_\_\_\_, "Impacts of BART on the Competitive Advantage and Efficiency of Bay Area Business Operations," McDonald & Grefe, Inc., Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB237 485/AS)

The report evaluates the economic effects of BART's transportation service on the competitive advantage and efficiency of Bay Area Business operations. The scope of the analysis includes potential economic impacts resulting from improved service and accessibilty for workers to jobs. The impact on regional competitive advantage due to location advantage or regional "image," and the possible economic efficiencies associated with BART service.

\* \* \* \* \*

## ECONOMIC IMPACTS

Muller, Thomas, Fiscal Impacts of Land Development, The Urban Institute, Washington, D. C., September, 1975. Available: The Urban Institute

The effects of development on the revenue and expenditures of local government are discussed. Fiscal impacts studies are used to determine whether development will generate enough new taxes to pay for the added public services required.

Methodology

Given the limited state of knowledge, the most effective approach is to estimate, directly by the use of surveys or indirectly from secondary sources the likely demographic and income characteristics of new residents by type of housing. These data can be applied to estimate both revenues expected to accrue and anticipated demand for public services.

Findings

- o Both revenues and expenditures from detached housing have been above the level of older housing.
- o Garden apartments frequently create a surplus because of the low number of school-age children compared to those in detached housing.
- o Commercial development create a fiscal surplus since they are unlikely to attract many new immigrants. However, new shopping centers frequently reflect a shift of existing retail activity -- not all new retail sales.
- o Office buildings are likely to provide more revenues than cost of service consumed.
- o Industrial developments are found to have a mixed effect when secondary impacts, particularly immigration, are considered.

\* \* \* \* \*

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB81-107 674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

### Findings

Rapid transit improvements might be used as one element of a coordinate package of efforts to revitalize a declining metropolitan area, but should not be relied upon solely or even primarily for such purpose.

### Retail Analysis

- o People who shopped in downtown did so during the day. However, people who shop in malls shop during the day and evening.
- o The CBD is most attractive only to those who live near the CBD.
- o The greatest advantages of CBD shopping are quality and variety of goods. These amenities are perceived as being much greater in the CBD than suburban malls.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

### Methodology

Important measure for shopping impact are:

1. Change in the number of stores and service, by type, available within (x) distance of (y) people.
2. Change in the percent of people generally satisfied with local shopping conditions.

\* \* \* \* \*

## ECONOMIC IMPACTS

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

### Findings

- o Much of the \$480 million variance between the actual and forecast capital costs caused by delay-related inflation and changes in scope could have been avoided or anticipated had BART's planning and construction been conducted differently.
  - i) Construction was delayed by protracted negotiations with cities and local agencies which resulted in many of the scope changes.
  - ii) Agreements were not reached before the project scope, schedule, and cost estimates were established.
- o Minimizing project schedule delays is the major factor in minimizing the variance between actual and forecast cost.
  - i) Establish realistic, attainable schedules.
  - ii) Manage the project to avoid delays to the schedule.

\* \* \* \* \*

          , Tariff Policies for Urban Transport, European Conference of Ministers of Transport, Report of the Forty-Sixty Round Table on Transport Economics, Paris, France, 1980. Available: O.E.C.D.

Presents arguments for and against subsidizing public transport. Short and long term needs are addressed by looking at assessment criteria for tariff policy, tariff policy alternatives, tariff policy for private transport, and recommendations on future tariff policy.

\* \* \* \* \*

          , The Impact of BART on Local Government Expenditures, Revenues and Financial Policies, Booz, Allen and Hamilton, Inc., Metropolitan Transportation Commission, San Francisco, CA., 1977. Available: NTIS (PB 291 956/AS)

An assessment of BART's impact on local government expenditures, revenues and financial policies in the Bay Area. The paper includes a comparison of financial trends in Bay Area cities with California cities in general and findings and conclusion on BART's impact on local tax rate decisions, local expenditures and revenues and the financing of local capital improvement projects.

\* \* \* \* \*

## ECONOMIC IMPACT

          , Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, Inc/Gruen Associates, California Department of Transportation, Sacramento, CA., 1976. Available: NTIS (PB 264 160)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

Methodology

A nine step procedure is outlined to determine the local fiscal impact of a transportation project. The principle procedural steps are as follows:

- Step 1) Identify local fiscal zone of influence.
- Step 2) Identify the existing land values.
- Step 3) Determine future land values excluding the project.
- Step 4) Determine future land values including the project.
- Step 5) Compare net land value changes.
- Step 6) Estimate developable land acreage.
- Step 7) Calculate right-of-way acreage.
- Step 8) Determine acreage from new access.
- Step 9) Identify development potential.

\* \* \* \* \*

          , Urban Transport and the Environment, Organization for Economic Co-Operation and Development, Paris, France, 1979. Available: O.E.C.D.

A series of four reports covers the preparation and highlights for a seminar entitled "Urban Transport and the Environment." The document includes background reports, case studies, an overview, and conclusions.

\* \* \* \* \*

## EMPLOYMENT

\_\_\_\_\_, "Economic Impacts of BART Capital and Operating Expenditures, McDonald & Grefe, Inc., Metropolitan Transportation Commission, San Francisco, CA., 1978. Available: NTIS (PB 283 061/AS)

Documents the changes in regional output and employment in the nine-country San Francisco Bay Area which resulted from expenditures for BART; impacts on employment opportunity and on construction wage rates are also evaluated.

\* \* \* \* \*

Dunphy, Robert T. and Robert E. Griffiths, The First Four Years of Metrorail: Travel Changes, The Metropolitan Washington Council of Governments, Washington, D. C., September, 1981. Available: Metropolitan Information Center of the Metropolitan Council of Government, and DOT Office of Technology and Planning Assistance.

This report describes travel pattern changes, and provides an analysis of rider characteristics and the effects of rapid transit on suburban employment.

#### Findings

In order to determine the effects of Metrorail on a suburban employment center a special case study of the Silver Spring station was conducted. The early findings indicated:

- o Metrorail commuting to Silver Spring jobs was a relatively small share of total transit community, and mostly reverse commuting from the District of Columbia.
- o Most Silver Spring workers live further out along the future rail line or in other parts of Montgomery County.
- o There was a greater increase in transit commuting to Silver Spring by workers using the expanded ride-on bus service designed to bring people to the rail station.
- o Forty percent of all Silver Spring employees made midday trips by Metrorail. Three of every four of these trips had previously been made by auto.
- o Any possible reduction in auto use by Metrorail users have been counteracted by diversion of other drivers to this corridor.
- o Silver Spring was an increased demand for 1,500 daily parking spaces by Metro users.

\* \* \* \* \*

## EMPLOYMENT

Dunphy, Robert T., Trends Before Metrorail, Metropolitan Washington Council of Governments and Office of Planning Assistance, UMTA. Washington, D. C., July 1982. Available: DOT Office of Technology and Planning Assistance.

This report describes trends before the opening of the Metrorail transit system.

Findings

- o Employment growth studies between 1972 indicate that most new jobs are being created in the suburbs. The majority of new jobs are not in location served by Metrorail. The only source of employment near Metrorail stations were governmental.

\* \* \* \* \*

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

Findings

- o BART apparently has not influenced employment growth significantly.
- o Employment growth related to BART has been greater in the older central cities of San Francisco and Oakland than the suburban areas. However, both San Francisco and Oakland modified their zoning to focus high-rise construction around the BART stations. No other city encouraged commercial development in the station areas to the same degree.
- o BART's greatest accessibility gains are to suburban residents commuting to downtown areas.
- o There appears to be little reverse commuting on BART by intercity minority residents to suburban jobs.
- o Blue collar employment areas are not convenient to BART stations, and swing shift work schedules have also served to minimize the possibility of BART usage.

\* \* \* \* \*

## EMPLOYMENT

Muller, Thomas, Economic Impacts of Land Development: Employment, Housing, and Property Values, The Urban Institute, Washington, D. C., September, 1976. Available: The Urban Institute

Land development impacts on private sector employment, housing, and land values are investigated in order to provide local governments with inexpensive methods for estimating these impacts on the demand for housing and employment.

Findings

- o Muller discusses or references techniques to estimate short-term private and public jobs and long term private and public jobs.
- o There are no generally acceptable methods for estimating the residence of those employed in new commercial or industrial facilities.
- o The short-term impact of new employment opportunities on existing local unemployment depends primarily on the type of unemployment in the community and the characteristics of the labor force required by new firms.
- o The impact of land development on employment, housing, income and other areas can be assessed with greater reliability at the regional rather than local level.
- o With the exception of the local public sector, second-order employment estimates should be considered only at the regional level.
- o It is extremely difficult to predict, future long range growth in specific industries which do not depend on local natural resources or the local market.
- o Information on local employment and unemployment conditions is typically limited.

\* \* \* \* \*

## EMPLOYMENT

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB81-107 674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

Findings

Women constitute the greatest segment of transit riders (70.6% in 1975). Nearly thirty percent of the total daily transit use was in the main street corridor. These facts illustrate the co-reinforcing nature of light rail in the corridor, increasing employment, especially as it attracts female employment and the growth of peripheral activity that reduce the cost of household travel.

\* \* \* \* \*

\_\_\_\_\_, "Study of the Office Construction Industry," John Blayney/David Dornbusch & Co., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 288 678/AS)

Part of the BART Impact, this study evaluates BART's effects on the three-county BART service area office construction industry. The study addressed specific issues of BART's effects on regional office location, local office location, and the timing of BART induced changes in office location patterns.

\* \* \* \* \*

## ENERGY

, Energy Conservation in Transportation, U.S. DOT, Washington, D. C., May, 1979. Available: Research Special Programs Administration Transportation Systems Center, Technology Sharing Office.

This document is to familiarize the general public with the terminology, policy issues, problems, and solutions that have been proposed to reduce the inefficient use of energy and promote conservation in transportation. The modes of private auto, mass transit, rail and air are discussed.

Findings

- o The viability and efficiency of a transit system is highly dependent on both the type of city and the service being offered.
- o Transit is generally regarded as energy efficient, yet it can not meet all needs for all urban travel.
- o Actions to shift persons from auto to mass transit can save a small but significant amount of energy.

\* \* \* \* \*

, Energy Problems and Urban and Suburban Transport, Organization for Economic Cooperation and Development, Paris, France, December, 1978. Available: O.E.C.D.

The report includes a review of selected statistics which provide an indication of the magnitude of energy consumption in the transportation sector and a summary of measures which can be taken with respect to existing and future motor vehicle populations as well as driver behavior and traffic operations to reduce energy consumptions. The report presents an approach for ranking the various measures and conclusions and recommendations with regard to the options available in transport energy consumption.

\* \* \* \* \*

, Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office Stock # 050-000-00163-6.

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

### Findings

#### Energy Used per Passenger

	% of Average Automobile
Dial-a-Ride	170
Automobile	100
Heavy Rail (new)	65
Car Pool	54
Commuter Rail	50
Light Rail	50
Heavy Rail (old)	39
Bus	30
Van Pool	24

\* \* \* \* \*

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Findings

- o New development has substantially increased downtown demands for water, gas, and electricity. This is largely a transfer of demand rather than an absolute increase in the Bay Area resources requirements.

\* \* \* \* \*

## ENERGY

, Mass Transportation Energy Conservation and Contingency Planning,  
Urban Consortium for Technology Initiatives, U.S. DOT, Washington, D.  
C., January 1980. Available: Public Technology, Inc.

The issues and problems facing local offices concerned with developing energy conservation and contingency plans necessary to insure the continuous movement of people and goods, even during a sudden fuel shortage, is the subject of this document. Main topics include conservation for mass transportation, contingency planning procedures, and contingency plan components. The document provides a list of current research programs and contacts as well as a current bibliography.

\* \* \* \* \*

Pushkarev, Boris and Jeffrey Zupan, Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit, Regional Plan Association, Inc., UMTA U.S. DOT, Washington, C. C., November 19  
Available: GPO, Stock # 050-000-00198-9

The purpose of this study is to explore what range of travel volume may be sufficient to warrant what type of fixed guideway investment; to indicate the location of urban corridors where such travel volumes may be found; to offer a rough, tentative assessment of the national market for fixed-guideway facilities; and to aid in focusing local alternatives analysis on the most promising locations.

### Findings

- o Using the procedures outlined in this document the following volume-related thresholds above which fixed guideways begin to save energy over a 22 to 45 year time period are:
  - i) 12-15 million place-miles per line-mile for above-ground rapid transit.
  - ii) 33-40 million place-miles per line-mile for rapid transit in tunnels.
  - iii) 7-9 million place-miles per line-mile for above ground light rail.
  - iv) 55-90 million place-miles per line-mile for downtown people-movers above ground.
- o At service volumes greater than 50 million place-miles per line-mile, one-third or more of the energy cost of rail transit may be paid for by savings from reduced auto ownership.
- o The mix of modes that a fixed guideway replaces has a strong bearing on how much energy it saves; it is basically the diversion from automobiles that results in the savings.
- o Rail systems can attain lower total energy cost per place-mile than 5 place autos in urban use with very low volumes of passengers.
- o Rail systems can attain lower total energy costs than buses operating in the urban area at medium to high service volumes.
- o Rubber-tired people movers at low volumes exceed the present urban auto in total energy consumption per place-mile.
- o Fixed guideway and free-wheeled mass transit vehicles have similar energy requirements for vehicle operation, regardless of diesel or electric propulsion.

## ENERGY

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB 81-118 077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

\* \* \* \* \*

Urban Transport and the Environment, Organization for Economic Co-Operation and Development, Paris, July 1979. Available: Organization for Economic Co-Operation and Development

A series of four reports covers the preparations and highlights for a seminar entitled "Urban Transport and the Environment." The documents include background reports, case studies, an overview and conclusions.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

1. Environmental impacts were studied by interviewing geologists and naturalists and by using instrument measurements.
2. Perceptions of nearby residents were measured by survey.

#### Findings

- o BART's overall environmental effects were neutral.
- o By placing BART facilities within or adjacent to other transportation rights-of-way, BART was able to minimize environmental disruption.
- o The most frequent impacts are train noise and the visual appearance of the train.
- o Train noise problems occur along approximately 10% of the line.
- o Elevated trackways tend to generate the greatest sound problems.
- o Most interviewed persons react indifferently to environmental impacts.

\* \* \* \* \*

## ENVIRONMENTAL IMPACTS

Buffington, Jesse L., et al., Non-User Impacts of Different Highway Designs as Measured by Land Use and Land Value Changes, Texas Transportation Institute, College Station, Texas, March 1978. Available: NTIS (PB 288 875/8GA)

This report contains a review of types of higher impacts, impact assessment elements, techniques available to measure land use and land value impacts and the findings of previous studies.

Methodology

1. Consideration is given to type of impact, location, timing, cause, magnitude, incidence, and significance of impact.
2. Classifying highway impact areas into stages of development can be used to study land use changes due to specific improvements.

Findings

- o An important determinant of land development and use for highways is accessibility to and from the area.
- o Distance from the CBD is an important variable for use in a model to forecast potential for land development and land use changes.
- o The relationship between land use and land value is strong and interwoven.

\* \* \* \* \*

\_\_\_\_\_, "Community Monitoring of the Environmental Impacts of BART," Curtis Associates and Gruen Associates, Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 369/AS)

A study which employed a variety of non-random, qualitative techniques to gain information on the general nature of community concerns for and responses to BART. This information served to verify that the major physical impacts perceived by the persons affected were being studied.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality.

\* \* \* \* \*

, Development Suitability of Environmentally Sensitive Areas Around the Rapid Transit System, Atlanta Regional Commission, U.S. DOT, Washington, D. C., June 1975.

Staff working paper. The analysis method measured slope, soil type and vegetation for each specific site. The objective was not to solve specific environmental problems but to analyze the ability of the site to sustain development. The study analyzed 10 sites in Atlanta.

#### Methodology

1. A generalized inventory was developed for slopes, soils, and vegetation.
2. Graphic overlays were used to view site suitability.

\* \* \* \* \*

          , Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office. Stock #050-000-00109-1

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values, aquatic ecosystems,; air quality, noise and vibration.

\* \* \* \* \*

          , "Environmental Impacts of BART: The User's Experience," DeLeuw, Cather & Co., Metropolitan Representation Commission, 1977. Available: NTIS (PB 280 200/AS)

A study of the BART travel experience - the immediate effects of BART as an "environment" for its users. The BART trip is described as a process, following the user from the desire to take a trip to the completion of that trip and exit from the BART System. BART characteristics to be encountered at each stage of the trip are described and evaluated. Conclusions and implications for design of future transit systems are drawn.

\* \* \* \* \*

## ENVIRONMENTAL IMPACTS

Fruin, J. J., Environmental Factors in Passenger Terminal Design, ASCE Journal of Transportation Engineering, V 98, Nte 1, February 1972. Available: ASCE

The primary elements of the external terminal environment are land use, the efficiency and configuration of the terminal's access systems, its esthetic and socioeconomic impact on the community, and its effects on the health, tranquility and natural ecology of the surrounding area. Internal environmental design elements are comprised of both objective and subjective factors including service standards, traffic characteristics, visual design, patron services, comfort and convenience, and maintainability.

\* \* \* \* \*

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

#### Methodology

1. Technical assessments were made using instrument measurement where possible.
2. Relevant documents were reviewed, including inventory maps of the natural environment.
3. Interviews with knowledgeable officials were conducted, accompanied by direct observation.

#### Findings

- o Current environmental impacts for BART were, as a whole, small.
- o Regional impacts were also small.
- o The only environmental impacts at BART station areas is the high level of on-street parking.
- o Some aerial BART lines have experienced adverse effects from train sound.

\* \* \* \* \*

\_\_\_\_\_, "Indirect Environmental Impacts," Gruen Associates, Inc.,  
Metropolitan Transportation Commission, 1977. Available: NTIS (PB  
280 201/AS)

The report documents land development and land use policy changes which have occurred in BART station areas between 1965 and 1975 and assesses the environments impacts associated with development and policy changes near twelve BART stations. In addition, it describes and evaluates changes in station area development quality in terms of public improvements made to some of these areas.

\* \* \* \* \*

Keyes, Dale L., Land Development and the Natural Environment: Estimating Impacts. The Urban Institute, Washington, D. C., 1976. Available: The Urban Institute

The effects of land development on the natural environment are investigated. Both simple manual techniques are complex computerized procedures are examined for estimating land use impacts.

#### Findings

- o Quantitative estimates of end impacts on man provide the most useful information to decision makers.
- o Communities should use target or budget values for analyzing air emissions, water effluents, and impervious cover in their comprehensive plans.
- o The Federal government should expand its testing program for impact estimation techniques.

\* \* \* \* \*

## ENVIRONMENTAL IMPACTS

Manheim, Marvin L., et al., Transportation Decision Making: A Guide to Social and Environmental Considerations, National Cooperative Highway Research Program Report 156, Transportation Research Board, Washington, D. C., 1975. Available: Transportation Research Board

An integrated approach for systematically incorporated, social, economic, and environmental factors into transportation planning and design is presented. The approach is described using specific techniques and case examples. Procedural guidelines, management and policy guidelines, and implementation and application experience are outlines.

Methodology

1. A four step process strategy is developed, including study design, exploration of alternatives, detailed analysis, and choice.

Findings

- o Design and planning of transportation systems is as much a political process as it is a technical one.
- o The differential effects of impacts must be determined so that adequate mitigation of adverse effects can be developed.

\* \* \* \* \*

\_\_\_\_\_, "Responses of Nearby Residents to BART's Environmental Impacts," DeLeuw, Cather & Co., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 280 202/AS)

Data analysis are from a home interview survey of some 700 persons living in ten case study sites, most within four blocks of the tracks or station parking lots. Perceptions, evaluations and behavioral responses reported by residents are compared with the study's earlier impact assessments made by staff.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

#### Methodology

1. Changes in the level of air pollutants and people effected by those changes should be measured.
2. Water pollution should be tested using past records kept by government agencies and then estimating net changes in the level of pollution.
3. Wildlife and vegetation can be inventoried, with projections made for impacts.

\* \* \* \* \*

Smith, Martin A., Field Test of an Environmental Impact Assessment Methodology, Environmental Resources Center, Georgia Institute of Technology, August 1974.

The planned Metropolitan Atlanta rapid transit system is used as a case example for applying the environmental impact methodology designed by Columbus Laboratories. The methodology includes a checklist of 68 environmental factors, a method for measuring the impact magnitude for each factor, and value functions for weighing the importance of diverse impacts.

\* \* \* \* \*

\_\_\_\_\_, Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

\* \* \* \* \*

## ENVIRONMENTAL IMPACTS

          , Urban Transport and the Environment, Organization for Economic Co-Operation and Development, Paris, July 1979. Available: Organization for Economic Co-Operation and Development

A series of four reports covers the preparations and highlights for a seminar entitled "Urban Transport and the Environment." The documents include background reports, case studies, an overview and conclusions.

Methodology

1. Background reports were submitted on specific topics.
2. Case studies on relevant urban transport policies were presented.

Findings

- o Bicyclists and pedestrians deserve attention as energy saving transportation modes.
- o Rededicating urban spaces to bicycles and pedestrians is popular with the public and good for business.
- o A program of orderly urban growth and land use will help solve long range environmental problems.

\* \* \* \* \*

---

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

### Findings

- o Neither the building nor the operation of BART have caused significant damage to the natural environment.
- o Some local effects were found.
- o Temporary storm water sedimentation due to erosion in trackway embankments in Hayward occurred.
- o No significant ecological systems or components are known to have been damaged or disturbed.

\* \* \* \* \*

---

, Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office. Stock #050-000-00109-1.

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values, aquatic ecosystems; air quality, noise and vibration.

### Methodology

1. Regional analysis uses existing information and survey-scale field studies.
2. Qualitative techniques are used for local assessment.

### Findings

- o Regional analysis should include estimations of rock susceptibility to accelerated weathering, erosion potential of soil types and slopes and the susceptibility of aquifers and recharge areas to contamination.
- o Local area investigations should rise on-site determinations of the likelihood of surface runoff reaching water bodies, the expected levels of erosion-sedimentation, and the likelihood of ground water contamination.

\* \* \* \* \*

## EROSION

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Methodology

1. Bay Area geological and ecological maps were reviewed to identify impact areas.
2. Aerial photos were used to identify affected areas.

### Findings

- o No damage to drainage as a result of station construction and operation has been recorded.
- o Local rainfall runoff has increased, but BART construction included provision of adequate storm sewer capacity.
- o Minor flooding has occurred at a few stations.
- o No significant property damage or personal damage has been noted.

\* \* \* \* \*

Keyes, Dale L., Land Development and the Natural Environment: Estimating Impacts. The Urban Institute, Washington, D. C., 1976. Available: The Urban Institute

The effects of land development on the natural environment are investigated. Both simple manual techniques and complex computerized procedures are examined for estimating land use impacts.

### Methodology

1. Generalizable mathematical formulas relating the aerial extent and type of development to stormwater runoff were used.
2. Both simple linear approximations and complex computerized models were tested.

### Findings

- o Local governments should consider specifying runoff-emission-, and water consumption-related "targets" in land use and zoning plans.
- o Detailed evaluations of individual proposals should be undertaken.
- o For conducting the detailed evaluations of individual developments the same watershed-wide techniques can be used.
- o Every technique reviewed needs additional verification.

\* \* \* \* \*

## INFRASTRUCTURE

\_\_\_\_\_, "A History of the Key Decisions in the Development of Bay Area Rapid Transit," McDonald & Smart, Inc. Metropolitan Transportation Commission, San Francisco, CA, 1975. Available: NTIS (PB 245 617/AS)

Key decisions in the planning and implementation of Bay Area Rapid Transit (BART) during the period 1947 through 1974 are reviewed. The decisions are analyze in terms of the influences brought to bear upon the decision-making process.

\* \* \* \* \*

Carp, Frances M., "Theory Background for Study of BART's Impacts on Perception and Response," Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 368/AS)

A review of behavioral science literature relevant to human perception and response. It outlines a possible strategy for the use of behavioral science theory: a conceptual model of the impact process is suggested which includes the element of human response and its determinants. An extensive bibliography is also included.

\* \* \* \* \*

\_\_\_\_\_, "Community Monitoring of the Environmental Impacts of BART," Curtis Associates and Gruen Associates, Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 369/AS)

A study which employed a variety of non-random, qualitative techniques to gain information on the general nature of community concerns for and responses to BART. This information served to verify that the major physical impacts perceived by the persons affected were being studied.

\* \* \* \* \*

\_\_\_\_\_, Environmental Assessment Handbook: Economic Impacts, Skidmore, Owings & Merrill, U.S. DOT, Washington, D. C., 1975. Available: U.S. Government Printing Office. Stock #050-00-00109-1

The transportation planning process is evaluated in terms of its economic impacts. Subject areas covered include employment, income and business activity, residential activity, effects on property taxes, regional and community plans and growth, and resources.

\* \* \* \* \*

## INFRASTRUCTURE

Environmental Assessment Handbook: Identification of Transportation Alternatives, Skidmore, Owings & Merrill, U.S. DOT, Washington, D. C., 1975. Available: U.S. Government Printing Office.

The principal transportation planning considerations which should be incorporated in all phases of the highway planning process, from initial transportation systems studied, through project location and design phases, to the actual construction of a new roadway improvement, are considered. The continuing and evolving nature of the process of alternatives generation is emphasized.

\* \* \* \* \*

Graebner, Linda S., Peter B. Giles, The Impact of BART on Public Policy, Booz, Allen and Hamilton, Inc., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118119)

Summarizes findings and conclusions of the Public Policy Project and presents policy implications for other metropolitan areas. Impacts of public policy actions are summarized in four areas: organization, finance, land use, and transportation.

#### Findings

- o BART's most significant impact has been on local land use policy.
- o BART precipitated numerous zoning and general plan changes in surrounding areas.
- o Local land use policy changes due to BART has helped change land use near BART.
- o BART has caused very few changes in institutional arrangements at the local, regional, or state level.
- o State highway facilities have not changed in response to BART.
- o BART has had a greater impact on urban core area public policy decisions rather than in urban residential or suburban area.
- o Rapid rail transit can influence the location and form of development if it is accompanied by supportive local land use policies.

\* \* \* \* \*

"Impact of BART on Governmental Structure, Organization and Operations," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 282 944/AS)

An assessment of BART's impact on local, regional and state governmental structure, organization and operations, on the formation and cohesion of private and community groups; and on municipal incorporation attempts in the BART district counties.

\* \* \* \* \*

## INFRASTRUCTURE

\_\_\_\_\_, "Impacts of BART on Bay Area Political Institutions," Jefferson Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 273 389/AS)

Describes the effects of BART and BART-related phenomena upon the process of political mobilization, political organization, and local political activity within two case study communities near BART stations. Policy implications of the research findings are also included.

\* \* \* \* \*

\_\_\_\_\_, "Indirect Environmental Impacts," Gruen Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 280 201/AS)

The report documents land development and land use policy changes which have occurred in BART station areas between 1965 and 1975 and assesses the environments impacts associated with development and policy changes near twelve BART stations. In addition, it describes and evaluates changes in station area development quality in terms of public improvements made to some of these areas.

\* \* \* \* \*

Langfeld, Stanley Chaitt, The Balanced and Orderly Development of the Site in Close Proximity to a Metro Station as a Contributor to a More Healthy and Economically Viable Urban Environment in the Washington Metropolitan Area, Urban Transportation Center, Washington, D. C., June 1971.

This study investigates how the balanced and orderly development of the site that is located in close proximity to the proposed Parkside Station of the Washington Metropolitan Area Transit Authority contributes to a more healthy and economically viable urban environment in the Washington Metropolitan area. The study examines the relationship of rapid transit facilities, land use, and land value, in addition to public sector policies that insure balanced and orderly development.

#### Findings

- o The use of a transit impact zone will help carefully plan public policy for orderly development of the site.
- o The development plan will upgrade the quality of life for area residents.
- o The public facilities will aid educational opportunities and cultural enrichment.

\* \* \* \* \*

## INFRASTRUCTURE

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals. Economic, environmental, aesthetic, public and private service, housing, and social concerns are considered.

\* \* \* \* \*

---

, Transit Impact Monitoring Program: Public Improvements in Station Areas, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

The various public capital improvements proposed to be constructed in relationship to the MARTA system are cataloged and updated to provide the status of individual projects, whether completed, under construction, or still planned for future construction.

\* \* \* \* \*

---

, The Growth Shapers: The Land Use Impacts of Infrastructure, Urban Systems Research and Engineering, Inc., May 1976. Available: U.S. Government Printing Office. Stock #041-011-00029-7

The role that public facility infrastructure investments play in the local development process is examined. The facilities that affect local growth by influencing the location and costs of new construction are covered in light of the effects on the density, timing, and amount of new development that they may have. Included are water and wastewater systems, power supplies, highway and secondary road networks, mass transit systems, and airports.

#### Methodology

1. A six step process for estimating development following infrastructure improvements is outlined.

#### Findings

- o Infrastructure investments can lead to local increases in demand for development or reductions in development costs, thereby encouraging private developers.
- o As communities plan development more compactly, more land can be left vacant and unimproved within town boundaries.
- o Development induced by infrastructure investments usually occurs in scattered locations away from already developed areas.
- o Infrastructure induced growth usually brings heavy environmental impacts.
- o Interaction of different infrastructure investments needs to be studied.

\* \* \* \* \*

## INFRASTRUCTURE

\_\_\_\_\_, "The Impact of BART on Land Use and Development Policy," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 291 956/AS)

\* \* \* \* \*

This study presents findings in four areas: (1) local government involvement in BART station location and design decisions related to land use policy; (2) BART impacts on local government planning studies, rezonings and use of special development incentives or controls; (3) BART impacts on local government policy regarding BART-related joint development, particularly public improvements, redevelopment and marketing; (4) the impact of BART-related land use policy upon actual changes in land use and development.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on Local Government Expenditures, Revenues and Financial Policies," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 291 956/AS)

An assessment of BART's impact on local government expenditures, revenues and financial policies in the Bay Area. The paper includes a comparison of financial trends in Bay Area cities with California cities in general and findings and conclusions on BART's impact on local tax rate decisions, local expenditures and revenues and the financing of local capital improvement projects.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on Local Transit Services and Financial Policy," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 292 402/AS)

Three specific policy areas were considered: (1) the impact of BART on changes in service, routes, fare, transfer and personnel policies of existing local transit operators; (2) the impact of BART on the creation of new local transit systems to provide feeder service to BART as well as local transit service; (3) the impact of BART on changes in state, regional, or local policies for financing local transit service.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on State Highway Plans and Policies," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 282 925/AS)

BART impacts evaluated include changes in highway facility development to access or parallel BART, changes in state highway policies with respect to BART, and the outcome of agreements between the state and BART on joint use of highway facilities.

\* \* \* \* \*

\_\_\_\_\_, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107 674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Findings

- o Few area-wide social or environmental impacts have occurred.
- o BART is not generally chosen for non-work trips.
- o BART's impacts on higher educational institutions vary according to location and policy.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality of life.

\* \* \* \* \*

\_\_\_\_\_, "Impacts of BART on Bay Area Health Care Institutions," Jefferson Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 266 614/AS)

The study describes the effects of BART on local health care institutions, as determined by surveys of patient travel to medical care facilities and inter with administrative personnel.

\* \* \* \* \*

## INSTITUTIONAL LAND USE

\_\_\_\_\_, "Impacts of BART on Bay Area Institutions of Higher Education and Their Students," Jefferson Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 273 396/AS)

This study describes the impacts of BART on institutions of higher education and on student life styles.

\* \* \* \* \*

Minkus, David, Impacts of BART on Bay Area Institutions and Life Styles, Jefferson Associates, Inc., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118127)

This report focuses on the effects of BART on the social institutions and life styles of Bay Area residents. It is the Final Report of the Institutions and Life Styles Project. The impacts on three primary institutional spheres are evaluated: local political institutions, including community responses to BART, institutions of higher education and their students, and health care institutions and their clients. Case studies designed to assess BART-related changes in organizational activities and in the social experience and expectations of the participants are described. The study of life style impacts was focused on the direct and indirect impact of BART on the use and experience of a variety of transportation modes, as well as on household routines, commuters' experiences, and the family as an institution.

#### Methodology

1. An awareness survey was conducted.
2. Exploratory interviews with administrators at 10 local colleges and universities and field observations were undertaken.

#### Findings

- o BART use for recreation is a small 6% of trips taken.
- o The data suggests that many riders have used BART for recreation or leisure purposes, but don't ordinarily use BART.
- o Reduced fares stimulate ridership for recreational purposes in off peak hours.
- o Youth use BART quite often for recreational reasons.
- o Few students use BART for their school commute.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

1. Changes in employment shifts for 66 Bay Area industry groups were compared.
2. Interviews were conducted.

#### Findings

- o The growth of the region as a whole has not been affected.
- o BART has influenced location decisions for federal and state offices more noticeably than for private business.
- o New office construction within several Bay Area communities has been pronounced.
- o New zoning codes has added incentives for office relocation.

\* \* \* \* \*

Boyce, David E., et al., Impact of Rapid Transit on Suburban Residential Property Values and Land Development: Analysis of the Philadelphia-Lindenwold High-Speed Line, Regional Science Department, Wharten School, University of Pennsylvania, Philadelphia, Pa., and the Office of the Secretary, U. S. DOT, Washington, D. C., November 1972. (PB 220-693/6) Available: NTIS

Analysis of the Philadelphia-Lindenwold High Speed Line indicates a modest, positive impact on suburban residential property values which is proportional to user's travel cost and time savings. Two statistical models of residential property values are estimated with data on about 20,000 residential property transactions during 1964-1971 in Camden and Gloucester Counties, New Jersey. Using an analysis of variance model, significant effects associated with inflation (time), neighborhood quality (location) and the interaction of time and location are estimated.

\* \* \* \* \*

## JOINT DEVELOPMENT

\_\_\_\_\_, "Development Patterns," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NRTIS (PB 289 704/AS)

BART's effects on Bay Area, corridor and station area land use are examined. The techniques utilized are regional regression analyses of BART's influence on population, housing and employment; statistical analyses of survey results; and key informant interviews.

\* \* \* \* \*

\_\_\_\_\_, Development Suitability of Environmentally Sensitive Areas Around the Rapid Transit System, Atlanta Regional Commission, U.S. DOT, Washington, D. C., June 1975.

Staff working paper. The analysis method measured slope, soil type and vegetation for each specific site. The objective was not to solve specific environmental problems but to analyze the ability of the site to sustain development. The study analyzed 10 sites in Atlanta.

\* \* \* \* \*

Donnelly, Paget, Rail Transit Impact Studies: Atlanta, Washington, San Diego, Price, Williams, and Associates, Office of Planning Assistance, U.M.T.A, Washington, D. C., March 1982.

The study assess the change in travel behavior which result from a major transportation system and develops information to aid future investment decisions.

#### Findings

- o Local land use plans have been altered to attempt to focus development on station areas.
- o Local jurisdictions appear to have recognized the value that developers place on transit access and are hoping to capitalize on this to enhance the local tax base.
- o Station area development has occurred primarily within  $\frac{1}{4}$  mile of the stations.
- o Land sales studies in Atlanta have shown significant activity in station areas.

\* \* \* \* \*

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118 135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

#### Methodology

1. Key informant interviews and a time series analysis of building permit data were undertaken.
2. Major retailers were questioned on development decisions.

#### Findings

- o BART has influenced the development of seven major projects.
- o BART's role in shift of office space locations has been indirect.
- o BART has not influenced the locations of retail establishments.

\* \* \* \* \*

Exhibiting Jurisdictions: Community Profiles and Site Marketing Information, Urban Consortium for Technology In, U.S. DOT, Washington, D. C., July 1980. Available: Public Technology, Inc.

Community profiles of nearly one hundred sites are the focus of this document. Marketing information on these sites is given for the purpose of making the private sector aware of development sites that are closely linked to existing or proposed public transportation facilities.

\* \* \* \* \*

"Indirect Environmental Impacts," Gruen Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 280 201/AS)

The report documents land development and land use policy changes which have occurred in BART station areas between 1965 and 1975 and assesses the environments impacts associated with development and policy changes near twelve BART stations. In addition, it describes and evaluates changes in station area development quality in terms of public improvements made to some of these areas.

\* \* \* \* \*

## JOINT DEVELOPMENT

          , Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office. Stock #050-000-00155-5

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

Findings

- o Joint development can encourage increased transit demand, provide funding assistance, add to the tax base, provide job opportunities, and improve land use in the urban environment.
- o Various institutional issues need resolution to encourage more joint development.

\* \* \* \* \*

          , Joint Development: Making the Real Estate Transit Connection, The Urban Land Institute, Washington, D. C., 1979. Available: The Urban Land Institute.

The report presents the joint development concept through several case studies of five areas. It is aimed at local officials, developers, and citizens for a view of how the joint development concept can be translated into practical, successful projects.

Methodology

1. Case studies were presented showing examples of major joint development projects.

Findings

- o Private developers are most attracted to sites with appropriate zoning regulations and minimal institutional interference.
- o Site locations that minimize construction problems and maximize pedestrian flow and commercial potential are preferred by private developers.
- o The availability of unencumbered sites ready for immediate use by developers are preferable.
- o Station entrances should be available to sites with the greatest developmental potential.
- o The cost of the project is extremely important to the developer.

\* \* \* \* \*

Knight, Robert L. and Lisa L. Trygg, Land Use Impact of Rapid Transit: Implications of Recent Experience Executive Summary, DeLewu, Cather & Company, U.S. DOT, Washington, D. C., December 1977. Available: NTIS (PB 287 190/3GA)

The focus centers on the economic/investment aspect of transportation projects and its relationships with the land-use transportation interaction phenomenon. The difficulty of introducing an economic investment variable into relevant models are examined. Supplementary policies to enforce and direct the operation of transportation investments is included.

#### Methodology

1. Case studies were used to investigate various issues.

#### Findings

- o Recent rapid transit developments have encouraged downtown development near stations, but only when accompanied by other factors.
- o The demand for new office and retail space has accompanied (commercial) land development near stations.
- o Land availability for development is a factor worth noting.
- o The location of other public facility improvements should be coordinated with transit improvements.

\* \* \* \* \*

Paaswell, R. and J. Berichman, Joint Development and the Interaction of Transportation and Urban Form, Transportation and Societal Systems Group, State University of New York, Buffalo, New York, August 1978.

The focus centers on the economic/investment aspects of transportation projects and its relationships with the land-use-transportation interaction phenomenon. The difficulty of introducing an economic investment variable into relevant models are examined. Supplementary policies to enforce and direct the operation of transportation investments is included.

#### Findings

- o Modeling the joint development-land use-transportation process can run into problems such as the unplanned effects resulting from investment, using traditional variables in untraditional situations, and employing inconsistent policies which conflict with long term land-use transportation investment.

\* \* \* \* \*

## JOINT DEVELOPMENT

, Proceedings of the Joint Development Marketplace, June 25-27, 1978, Public Technology, Inc., U.S. DOT, Washington, D. C., 1978.  
Available: Public Technology, Inc.

Topics related to joint development addressed in this document include the following: a summary of the Joint Development Marketplace; a developer's, Federal, and mayoral perspective on joint development; two case studies; two evolving projects; a summary of the Federal and Financial Panels; background papers; coverage from conference workshops, a Site Marketing Information Summary and Sheets; and a list of conference attendees.

### Findings

- o The Federal government is committed to joint development as a means for enhancing public investments.
- o Actual and potential delay discourages joint development.
- o Financial institutions pay close attention to the uncertainty of having their funds tied up for long periods.
- o Politicians fear project delay as a negative reflection on them.
- o Transit operators fear delays in private development will also delay the transit improvement.
- o The joint development process must include resident participation in planning projects that affect their neighborhoods.
- o Joint development plans should recognize the outlined obstacles and minimize them to the extent possible.

\* \* \* \* \*

Sharpe, Carl P., Value Capture and Joint Development Applications: Chicago, Louisville, Los Angeles, U.S. DOT, Washington, D. C., 1977.  
Available: NTIS (PB 272 512/5G1)

Value capture policy is evaluated using highlights of findings from previous work at Rice University, defines how value capture can be implemented, describes legal, financial, and community design issues associated with the value capture concept and summarizes the conclusions reached and the methodology employed in the research. Three case studies are included.

\* \* \* \* \*

## JOINT DEVELOPMENT

\_\_\_\_\_, "Study of the Office Construction Industry," John Blayney/David Dornbusch & Co., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 288 678/AS)

The study evaluates BART's effects on the three-county BART service area office construction industry. The study addressed specific issues of BART's effects on regional office location, local office location, and the timing of BART-induced changes in office location patterns.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on Land Use and Development Policy," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 19767. Available: NTIS (PB 291 956/AS)

This study presents findings in four areas: (1) local government involvement in BART station location and design decisions related to land use policy; (2) BART impacts on local government planning studies, rezonings and use of special development incentives or controls; (3) BART impacts on local government policy regarding BART-related joint development, particularly public improvements, redevelopment and marketing; (4) the impact of BART-related land use policy upon actual changes in land use and development.

\* \* \* \* \*

\_\_\_\_\_, Transit Station Area Development Studies Summary, Atlanta Regional Commission, U.S. DOT, Washington, D. C., September 1977.

Slope, soils and vegetation properties of 10 specific sites were analyzed to determine developmental potential. The objective of this analysis is not to solve specific environmental problems but to determine the ability of these sites to sustain varying land uses and densities.

\* \* \* \* \*

## JOINT DEVELOPMENT

,Transit Station Joint Development, Skidmore, Owings, & Merrill, U.S. DOT, Washington, D. C., June 1973. Available: NTIS (PB 225 629)

The institutional, economic, legal, engineering and design problems associated with the joint development of transit stations are examined. By using several station sites for a detailed study, this report aims to assist in the preparation of draft UMTA applications for joint development planning funds.

Methodology

1. A project team representing different agencies were assembled to examine various factors associated with joint development.
2. Case studies were also analyzed.

Findings

- o Fragmentation of government institutions can impede joint development plans.
- o Many agencies use inadequate planning and redevelopment coordination actions.
- o Poor station design plans can lead to inadequate transportation coordination and ridership loss.
- o All phases of joint development should be integrated from the beginning.
- o Public and private agencies and groups should all participate in the planning process.
- o Federal and State guidelines need clarification and coordination.

\* \* \* \* \*

## LEVEL OF SERVICE

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Findings

- o An attractive, modern rail system such as BART can attract people away from their autos.

\* \* \* \* \*

Baumgartner, J. P., Indicators for Evaluating Transport Output, Report of the Forty-Third Round Table of Transport Economics, European Conference of Ministers of Transport, Paris, November 1978. Available: Organization for Economic Cooperation and Development.

A number of principles are identified for the formulation of a statistical system whereby transport sector output can be measured. Items for consideration include transit operator needs, planner's needs, data collection, design of indicators, level of aggregation, physical or value indicators, and useful indicators.

#### Findings

- o Disaggregated, qualitative indicators directly reflect needed improvements in transportation output.

\* \* \* \* \*

Dunphy, Robert T. and Robert E. Griffiths, The First Four Years of Metrorail: Travel Changes, The Metropolitan Washington Council of Governments, Washington, D. C., September, 1981. Available: Metropolitan Information Center of the Metropolitan Council of Government.

This report describes travel pattern changes, and provides an analysis of rider characteristics and the effects of rapid transit on suburban employment.

\* \* \* \* \*

## LEVEL OF SERVICE

Sherret, Alistair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

### Methodology

1. A travel survey questionnaire contained questions on influence of individual travelers' mode choice decisions.
2. Ratings for each attribute was measured on a seven-point semantic differential scale.
3. Mathematical mode choice models were also used.

### Findings

- o BART provides travel time savings for many trips.
- o Travelers generally perceive BART favorably as to its qualitative service.
- o Comfort and other qualitative aspects of service are apparently not an important consideration in most people's choice between BART and bus or car.

\* \* \* \* \*

, Transit Impact Monitoring Program: Annual Report, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze and evaluate the various transportation and land use impacts of the construction and operation of the MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

\* \* \* \* \*

, Transport Choices for Urban Passengers: Measure and Models,  
 Organization for Economic Co-Operation and Development, Paris,  
 September 1980. Available: Organization for Economic Co-Operation  
 and Development

The study reviews short-and medium-term measures to influence the choice between different kinds of urban passenger transport, including private cars, public transport, bicycles and walking. Over thirty experimental schemes implemented in selected OCED cities are analyzed. The study also contains an indepth evaluation of modal split models used for prediction in the process of improving urban transport planning and management.

#### Findings

- o Most level of service changes have been largely ineffective.
- o Elasticity models are useful in estimating short-run impacts on travel for small changes in level-of-service.

\* \* \* \* \*

, Urban Public Transport: Evaluation of Performance, Organization,  
 for Economic Co-Operation and Development, Paris, October 1980.  
 Available: Organization of Economic Co-Operation and Development.

Designed to aid local officials, this study of evaluation methods and performance indicators assesses the options and strategies for urban transport operation and investment. Performance is evaluated regarding internal efficiency and community impact analysis.

#### Findings

- o Level of service should be measured for each system element and by line.

\* \* \* \* \*

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on model split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on Local Transit Services and Financial Policy," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 292 402/AS)

Three specific policy areas were considered: (1) the impact of BART on changes in service, routes, fare, transfer and personnel policies of existing local transit operators; (2) the impact of BART on the creation of new local transit systems to provide feeder service to BART as well as local transit service; (3) the impact of BART on changes in state, regional, or local policies for financing local transit service.

\* \* \* \* \*

\_\_\_\_\_, "The Impact of BART on State Highway Plans and Prices," Booz, Allen & Hamilton, Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 282 925/AS)

BART impacts evaluated include changes in highway facility development to access or parallel BART, changes in state highway policies with respect to BART, and the outcome of agreements between the state and BART on joint use of highway facilities.

\* \* \* \* \*

, Transit Impact Monitoring Program: Results of Station Area Studies, Atlanta Regional Commission, U.S. DOT, Washington, D.C., August 1981.

Empirical data related to the MARTA rail system was collected and analyzed to describe aspects of station area activity along the East and West Lines, including station patronage, mode of access to MARTA stations, parking in MARTA lots, on street parking, and pedestrian crossings at intersections. The methodology used to collect and analyze the data, along with the findings of the data analysis, are presented in this report.

#### Findings

- o The integrated bus-rail system significantly increased the frequency of transfers in the system.
  
- o Patronage increased when feeder bus service was added to the West Line.

\* \* \* \* \*

## NEIGHBORHOOD CHARACTER

Appleyard, Donald and Frances Carp., BART Residential Impact Study - Station and Channel Typology, Institute of Urban and Regional Development, University of California, Berkeley, California, August 1972.

The Typology studies BART's impact on residential environments using the physical characteristics of BART and the physical/socio-economic characteristics of neighborhoods. The BART descriptors range from type of roadbed to degree of landscaping. The neighborhood is characterized by age-race-ethnic variables as well as housing quality and value. Thirty-four station locations are surveyed.

\* \* \* \* \*

Environmental Assessment Handbook: Social Impacts, Skidmore, Owings and Merrill, U.S. DOT, WASHINGTON, D. C., 1975. Available: U.S. Government Printing Office. Stock #050-000-00109-1

The social impacts relating to the transportation planning process are discussed under the topics of community cohesion, accessibility of facilities and services, and the displacement of people.

\* \* \* \* \*

"Program-Wide Case Studies," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 291 388/AS)

In-depth, policy-oriented case studies of BART's impacts on selected communities-downtown San Francisco and Oakland, representing urban core areas: The Mission District of San Francisco, the Rockridge neighborhood in Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, representing suburban areas.

\* \* \* \* \*

Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of the MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

### Methodology

1. Residential attitude surveys were administered.

### Findings

- o The majority of residents felt the transit stations blended well into their community.

\* \* \* \* \*

## NOISE POLLUTION

, Background Document/Environmental Explanation for Proposed Interstate Rail Carrier Noise Emission Regulations, March, 1974, Environmental Protection Agency: Office of Noise Abatement and Control, Washington, D. C. EPA/550/9-74/005: March 1974 Available: National Technical Information Service, PB-261 397/4ST

Contents: Data base for the regulation; Railroad noise sources; Summary of what the proposed regulations will require; Enforcement considerations; Economic effects of a retrofit program; Environmental effects of proposed regulations; Selection of the proposed regulations. (Portions of this document are not fully legible.)

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107 674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

1. A residential survey was conducted.
2. Instantaneous sound level readings were recorded.

#### Findings

- o Because of quiet slowing and stopping, BART trains have not resulted in significant noise around stations.
- o Noise is a problem around some elevated BART lines.
- o Orientation of homes nearest BART lines was found to effect resident perception of BART noise.

\* \* \* \* \*

## NOISE POLLUTION

, Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office.

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values; aquatic ecosystems; air quality and noise vibration.

\* \* \* \* \*

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

#### Methodology

1. Wayside sound levels were measured by instruments aboard the BART trains.
2. Vibration was measured using a velocity-sensitive vibration transducer.
3. Observations and checks with local officials were conducted.
4. Residential surveys included noise related questions.

#### Findings

- o BART station activities, traffic, and trains have not noticeably increased sound levels.
- o The quietness of stopping trains has helped reduce station-related noise.
- o BART related peak period noise showed no significant increase in ambient noise levels.
- o Areas with heavy automobile access did note adverse noise effects.
- o BART train sound on above ground lines is bothersome to near by residents.

\* \* \* \* \*



## OPERATING COST

\_\_\_\_\_, "A Description of BART: Its Facilities, Service and Surroundings," Gruen Associates, Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB 287 338/AS)

This report describes the BART System, its operations, costs, and ridership. Characteristics of the population, employment, and land uses in the nine-county Bay Area are also describe.

\* \* \* \* \*

\_\_\_\_\_, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

1. Input-output analyses were used to evaluate operating costs.

#### Findings

- o Fares for short trips on buses and on BART are generally equal.
- o BART fares are lower than out-of-pocket costs for automobile travel.
- o BART cost per passenger and per passenger mile are expected to decrease as ridership increases.

\* \* \* \* \*

\_\_\_\_\_, Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office. Stock #050-000-00163-6

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

#### Findings

- o The costs of maintaining a defined level of service should be the basis for developing estimates for the annual operating budget.
- o Labor costs account for 70-80% of transit operating expenses.

\* \* \* \* \*

## OPERATING COSTS

, Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office; see p. 134.

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

\* \* \* \* \*

Pushkarev, Boris and Jeffrey Zupan, Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit, Regional Plan Association, Inc., UMTA U.S. DOT, Washington, C. C., November 1980 Available: Stock # NTIS PB82 106907

The purpose of this study is to explore what range of travel volume may be sufficient to warrant what type of fixed guideway investment; to indicate the location of urban corridors where such travel volumes may be found; to offer a rough, tentative assessment of the national market for fixed-guideway facilities and to aid in focusing local alternatives analysis on the most promising locations.

#### Findings

- o Rail users realize reduced monetary costs related to operating and parking an automobile.

\* \* \* \* \*

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

#### Findings

- o Over half of BART's total operating expense is for system maintenance.
- o Fare revenues covered 37% of net operating costs.
- o BART operating cost per passenger is \$1,93; on the high side.
- o BART's average trip length of 13 miles is also longer than typical.

\* \* \* \* \*

## OPERATING COSTS

\_\_\_\_\_, "The Distribution of the Tax Burden of Financing BART's Construction and Operations," McDonald & Grefe, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 282 990/AS)

The report identifies the sources of BART's capital financing and assigns the burden of each revenue source geographically as well as to economic sectors. The equity of BART's financing methods is evaluated.

\* \* \* \* \*

\_\_\_\_\_, Transit Impact Monitoring Program: Annual Report, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze and evaluate the various transportation and land use impacts of the construction and operation of the MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

\* \* \* \* \*

## PARKING

Appleyard, Donald and Frances Carp., BART Residential Impact Study - Station and Channel Typology, Institute of Urban and Regional Development, University of California, Berkeley, California, August 1972.

The Typology studies BART's impact on residential environments using the physical characteristics of BART and the physical/socio-economic characteristics of neighborhoods. The BART descriptors range from type of roadbed to degree of landscaping. The neighborhood is characterized by age-race-ethnic variables as well as housing quality and value. Thirty-four station locations are surveyed.

\* \* \* \* \*

Boyce, David E., et al., Impact of Access Distance and Parking Availability on Suburban Rapid Transit Station Choice: Analysis of the Philadelphia-Lindenwold High-Speed Line, Regional Science Department, Wharten School, University of Pennsylvania and Office of the Secretary, U. S. DOT, Washington, D. C., November 1972. Available: NTIS (PB-220 694/4)

The purpose of this study is to examine the effect of station location, or access cost to competing stations, and parking availability on user's station choice. Observed station choice behavior of transit riders under changing conditions of (a) parking lot capacity and (b) mix of free and pay parking is the basis for testing a simple model of station choice.

#### Findings

- o Users do act so as to minimize the sum of access cost including the value of travel time, parking cost and fare.
- o The model developed verified the above finding.

\* \* \* \* \*

## PARKING

DiRenzo, John F., Bart Cima, Edward Barber, Study of Parking Management Tactics: Overview and Case Studies, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D.C., December 1979. Available: NTIS (PB81-214033)

The report documents and assesses the planning, implementation, and operational characteristics of on-street parking, off-street parking for activity centers; fringe and corridor parking; pricing tactics; enforcement; and marketing tactics. Twenty case studies were used in the development of the study.

### Methodology

1. An extensive literature review was done, followed by telephone interviews, on-site investigations, and case studies.

### Findings

- o The most widely used innovative parking technique used is residential permits parking programs.
- o Implementing HOV and transit incentives is easier when combined with parking management tactics.

\* \* \* \* \*

---

, Evaluation of Urban Parking Systems, Organization for Economic Cooperation and Development, Paris, France 1980. Available: Organization for Economic Cooperation and Development.

The report presents a study of "Methods of Evaluation Urban Parking System." Major types of parking facilities and parking characteristics are reviewed, the aims of parking strategies are considered and methods for evaluating the parking measures are investigated. A survey of fifteen cities is included.

### Findings

- o The role of parking in the urban scene has changed.
- o The evolving view of parking is to design parking strategies which help manage the auto.
- o Emphasis should be put on combining public transit improvements with parking strategies.
- o A system approach is the best way to interface parking strategies with transit.

\* \* \* \* \*

## PARKING

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

Methodology

1. Before and after neighborhood parking surveys were conducted.
2. Counts of cars in park-and-ride lots were performed.

Findings

- o No impacts on neighborhood parking were apparent in the East Line Corridor.
- o In some areas, parking lots were filled to overcapacity.

\* \* \* \* \*

## PARKING

, Transit Impact Monitoring Program: Results of Station Area Studies, Atlanta Regional Commission, U.S. DOT, Washington, D.C., August 1981.

Empirical data related to the MARTA rail system was collected and analyzed to describe aspects of station area activity along the East and West Lines, including station patronage, mode of access to MARTA stations, parking in MARTA lots, on street parking, and pedestrian crossings at intersections. The methodology used to collect and analyze the data, along with the findings of the data analysis, are presented in this report.

Methodology

1. Parking lot counts at MARTA stations were undertaken.
2. Parking inventory and demand surveys were made.

Findings

- o End of the line stations realized the greatest demand for parking.
- o The Avondale Station experienced significant political pressure and publicity because of scarce parking conditions.
- o On-street parking in residential areas does not appear to be a problem.
- o Restrictions and meters have helped solve parking problems in some areas.
- o Additional parking restrictions are needed in some areas.

\* \* \* \* \*

, Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

\* \* \* \* \*

\_\_\_\_\_, "A Description of BART: Its Facilities, Service and Surroundings," Gruen Associates, Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB 287 338/AS)

This report describes the BART System, its operations, costs, and ridership. Characteristics of the population, employment, and land uses in the nine-county Bay Area are also describe.

\* \* \* \* \*

Dunphy, Robert T. and Robert E. Griffiths, The First Four Years of Metrorail: Travel Changes, The Metropolitan Washington Council of Governments, Washington, D. C., September, 1981. Available: Metropolitan Information Center of the Metropolitan Council of Government and DOT Office of Technology and Planning Assistance.

This report describes travel pattern changes, and provides an analysis of rider characteristics and the effects of rapid transit on suburban employment.

#### Methodology

1. Passenger surveys were taken.

#### Findings

- o METROrail ridership has grown continuously since reopening, even during seasons when transit ridership usually declines.
- o The downtown METRO carried more passengers than expended:

\* \* \* \* \*

## PASSENGER VOLUMES

Graebner, Linda S., et al., The Local Policy Implications of BART Development, Booz, Allen and Hamilton, Inc., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118069)

The report assesses whether BART achieved its original objectives of local communities local governmental guidelines are presented to aid in the planning, designing or construction of a transit system. The report is organized into five chapters relating to major areas of local policy: transportation, land use, finance, economic development and environment.

### Methodology

1. Six major analytical and review activities were selected to analyze BART impacts on policy issues.

### Findings

- o BART has only had a minor impact on traffic congestion on local streets.
- o Reasons for BART's limited impact on congestion and road building is influenced by local and state political processes.

\* \* \* \* \*

, Light Rail Rapid Transit for Buffalo: Capital Cost, Ridership and Financial Projections: Interim Results, Niagara Frontier Transit Authority Metro Construction Division, Buffalo, New York, April 1978.

Preliminary forecasts for 1985 are presented for the ridership impacts of the proposed light rail rapid transit system for Buffalo, New York. Study elements include complementary bus network alternatives, person trip and distribution forecasts, a mode choice model, proposed fare policies, bus ridership forecasts, bus operating cost methodology and expense forecasts, transit operating financial forecasts, and interim 1985 station and line segment volume estimates.

### Methodology

1. Ridership forecasts were projected for 1985.

### Findings

- o 60,000 to 67,000 daily rail riders are projected.
- o Ridership should rise about 2% per year without making any system changes.

\* \* \* \* \*

## PASSENGER VOLUMES

Pushkarev, Boris and Jeffrey Zupan, Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit, Regional Plan Association, Inc., UMTA U.S. DOT, Washington, C. C., November 1980 Available: NTIS PB81-185183

The purpose of this study is to explore what range of travel volume may be sufficient to warrant what type of fixed guideway investment; to indicate the location of urban corridors where such travel volumes may be found; to offer a rough, tentative assessment of the national market for fixed-guideway facilities and to aid in focusing local alternatives analysis on the most promising locations.

### Findings

- o In the newly urbanizing parts of the world, systems tend to be short.
- o Loads average 90 million passenger-miles of travel per mile of line in newly urbanized area.
- o U.S. loads average 20 million passenger miles of travel per mile of line.
- o Loads on light rail are lower than on rapid transit.
- o Systems with high annual loads have high peak period volumes.

\* \* \* \* \*

Sherret, Alestair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

### Findings

- o Ridership tends to be heavily concentrated in the morning and evening peak periods.
- o Patterns of ridership tend to be heavily weighted in one direction.
- o Early ridership fell far short of projections.
- o Other rail systems should be careful to make realistic assessments of projected ridership levels.

\* \* \* \* \*

## PASSENGER VOLUMES

          , Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

Methodology

1. Traffic count data was collected for a before and after study.
2. Descriptive statistics and screenline summaries were compiled.

Findings

- o At certain spots, traffic increased during the mid-day and evening hours but decreased during the A.M. and P.M. peak hours.
- o None of the streets were congested during the periods of data collection.

\* \* \* \* \*

          , Transport Choices for Urban Passengers: Measure and Models, Organization for Economic Co-Operation and Development, Paris, September 1980. Available: Organization for Economic Co-Operation and Development

The study reviews short-and medium-term measures to influence the choice between different kinds of urban passenger transport, including private cars, public transport, two wheelers and walking. Over thirty experimental schemes implemented in selected OCED cities are analyzed. The study also contains an indepth evaluation of modal split models used for prediction in the process of improving urban transport planning and management.

Findings

- o To try and influence modal split, volume and characteristics of riders must be carefully monitored.

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality of life.

\* \* \* \* \*

, Pedestrian Movement, Urban Consortium for Technology Initiatives, U.S. DOT, Washington, D. C., January, 1980. Available: Public Technology, Inc.

The issues and problems related to pedestrian movement, including safety, is covered in this reading contacts and current programs are identified, and an annotated bibliography is included.

#### Findings

- o Current safety programs and methods of pedestrian safety are not working.
- o Most pedestrian accidents occur because of faulty physical planning.
- o Enforcement measures such as ticketing have been largely ineffective.

\* \* \* \* \*

## PEDESTRIAN

, Transit Impact Monitoring Program: Results of Station Area Studies, Atlanta Regional Commission, U.S. DOT, Washington, D.C., August 1981.

Empirical data related to the MARTA rail system was collected and analyzed to describe aspects of station area activity along the East and West Lines, including station patronage, mode of access to MARTA stations, parking in MARTA lots, on street parking, and pedestrian crossings at intersections. The methodology used to collect and analyze the data, along with the findings of the data analysis, are presented in this report.

### Methodology

1. Before and after study data was collected for pedestrian facilities at 18 intersections.

### Findings

- o Eight intersections realized a doubling of pedestrian activity following the opening of MARTA.
- o Pedestrian/vehicular conflicts are most likely to occur at bulk off loading at station exits.
- o Remedial action is warranted at least at three stations.

\* \* \* \* \*

, Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

### Methodology

1. An initial evaluation is used to determine hazardous pedestrian/traffic interface.
2. Then calculate the general pedestrian dependency, school pedestrian dependency, local shopping pedestrian dependency, social institution pedestrian dependency, and total pedestrian dependency.
3. The last step is to determine the impact-perception-response.

\* \* \* \* \*

, Urban Transport and the Environment, Organization for Economic Co-Operation and Development, Paris, July 1979. Available: Organization for Economic Co-Operation and Development

A series of four reports covers the preparations and highlights for a seminar entitled "Urban Transport and the Environment." The documents include background reports, case studies, an overview and conclusions.

#### Findings

- o Safety is the major problem affecting pedestrians in urban transportation.
- o Transportation planning measures which favor pedestrians affect the use of other modes, both public and private.
- o Special facilities for pedestrians need careful planning to insure the intended level of use.

\* \* \* \* \*

## POPULATION

\_\_\_\_\_, "Development Patterns," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NRTIS (PB 289 704/AS)

BART's effects on Bay Area, corridor and station area land use are examined. The techniques utilized are regional regression analyses of BART's influence on population, housing and employment; statistical analyses of survey results; and key informant interviews.

\* \* \* \* \*

Dunphy, Robert T., Trends Before Metrorail, Metropolitan Washington Council of Governments and Office of Planning Assistance, UMTA. Washington, D. C., July 1982

This report describes trends before the opening of the Metrorail transit system.

### Findings

- o Population growth forecasts have dropped dramatically since the period when Metrorail was planned. Expectations of employment increases for the year 2000 have declined, but not as much as forecasts for population and households.

\* \* \* \* \*

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, for U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB81-107674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

### Methodology

1. A number of models were used to analyze impacts of the LRRI project, including an accessibility model, a shopping probability model, and an urban activity model.

### Findings

- o The impact of investment alone served to increase service employment in the CBD and reduce residential population.
- o Major population gains will be regional shifts between suburban zones.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107 674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

### Findings

- o BART's influence on price increases was most pronounced for homes within 500 feet of a station, diminishing rapidly as distance increased.
- o Property price gains attributable to BART have been negligible.
- o Study findings refute the theory that a rapid transit system is likely to cause large price increases for property near BART stations which could be taxed to help pay for the system.
- o Increases in property prices were most prevalent during the planning and construction phase of BART, tapering off after that. Residential rents are less likely than property prices to be sensitive to anticipation of long-term benefits from planned transit services.
- o Office rents were affected more consistently by BART than residential rents.

\* \* \* \* \*

\_\_\_\_\_, "BART's Consumption of Land and Property," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 287 797/AS)

A documentation of BART's consumption of land and property occupied by business or residents. The relocation process and the development on surplus land acquired by BART is described.

\* \* \* \* \*

## PROPERTY VALUES

Baum, H. and W. Kentner, Tariff Policies for Urban Transport, European Conference of Ministers of Transport, Report of the Forty-Sixth Round Table on Transport Economics, Paris, March 1979. Available: Organization for Economic Co-Operation and Development

This report presents arguments for and against subsidizing public transport. Short and long term needs are addressed by looking at assessment criteria for tariff policy, tariff policy alternatives, tariff policy for private transport, and recommendations on future tariff policy.

### Findings

- o Current practice to correct cost problems by taxation are neutralized in other sectors.

\* \* \* \* \*

Boyce, David E., et al., Impact of Rapid Transit on Suburban Residential Property Values and Land Development: Analysis of the Philadelphia-Linderoold High-School Line, Regional Science Department, Wharten School, University of Pennsylvania, Philadelphia, PA, and the Office of the Secretary, U.S. DOT, Washington, D. C., November 1972. Available: NTIS (PB220 693/6)

Analysis of the Philadelphia-Linderoold High Speed Line indicates a modest, positive impact on suburban residential property values which is proportional to user's travel cost and time savings. Two statistical models of residential property values are estimated with data on about 20,000 residential property transactions during 1964-1971 in Camden and Gloucester Counties, New Jersey. Using an analysis of variance model, significant effects associated with inflation (time), neighborhood quality (location) and the interaction of time and location are estimated.

\* \* \* \* \*

Boyce, David E., "Notes on the Methodology of Urban Transportation Impact Analysis," Highway Research Board Special Report #111, Highway Research Board, Washington, D. C., 1970. Available: HRB

The methodological question is (a) how to provide for experimental control and (b) how to obtain replications of the experiment.

### Findings

The procedure of such studies is (a) to record the values of pertinent variables, such as land value, construction value, travel volumes, and speeds, for a period of time prior to the introduction of the facility; (b) to record the value of the same variables for a comparable time period following the introduction of the facility; and (c) to compare the 2 sets of values.

\* \* \* \* \*

Buffington, Jesse L., et al., Non-User Impacts of Different Highway Designs as Measured by Land Use and Land Value Changes, Texas Transportation Institute, College Station, Texas, March 1978. Available: NTIS (PB 288 875/8GA)

This report contains a review of types of higher impacts, impact assessment elements, techniques available to measure land use and land value impacts and the findings of previous studies.

#### Findings

- o Land values are greatly affected by area accessibility, growth potential, development stage, existing land use, and land use control in regards to highway improvement projects.

\* \* \* \* \*

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTRIS (PB81-118 135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

#### Methodology

1. A before-after multiple regression technique was used.
2. Explanatory models were used to measure changes in property rents and prices before, during, and after BART's construction.

#### Findings

- o Proximity to selected BART stations revealed small but significant increases in the prices of single family dwellings.
- o Small but noticeable effects were also detected for increases in office rents near BART stations.
- o Initial positive effects on property prices have largely disappeared.
- o A value capture system to redeem the benefits of the increased property prices would not be worth the effort, considering the relatively small increases in value.

\* \* \* \* \*

## PROPERTY VALUES

Environmental Assessment: Economic Impacts, Skidmore, Owings & Merrill, U.S. DOT, Washington, D. C., 1975, Available: U.S. Government Printing Office. Stock #050-000-00109-1

The transportation planning process is evaluated in terms of its economic impacts. Subject areas covered include employment, income and business activity; residential activity; effects on property taxes, regional and community plans and growth, and resources.

\* \* \* \* \*

Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office. Stock #050-000-00163-6

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

\* \* \* \* \*

Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office. Stock #050-000-00155-5

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

### Findings

- o Special Benefit Assessments which are leveled against property in a district served by transit for the purpose of financing public investment in that district, can be an important method for financing transit improvements. These assessments are often justified as a financing technique which awards some legal restrictions.

\* \* \* \* \*

Minkus, David, Impacts of BART on Bay Area Institutions and Life Styles, Jefferson Associates, Inc., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118127)

This report focuses on the effects of BART on the social institutions and life styles of Bay Area residents. It is the Final Report of the Institutions and Life Styles Project. The impacts on three primary institutional spheres are evaluated: local political institutions, including community responses to BART, institutions of higher education and their students, and health care institutions and their clients. Case studies designed to assess BART-related changes in organizational activities and in the social experience and expectations of the participants are described. The study of life style impacts was focused on the direct and indirect impact of BART on the use and experience of a variety of transportation modes, as well as on household routines, commuters' experiences, and the family as an institution.

#### Methodology

1. Panel interviews and field interviews were conducted..

#### Findings

- o Interviewed residents perceived BART as contributing to the desirability and value of homes within the community.
- o Access to BART has become an added component defining residential location desirability.

\* \* \* \* \*

Muller, Thomas, Economic Impacts of Land Development: Employment, Housing, and Property Values, The Urban Institute, Washington, D. C., September, 1976. Available: The Urban Institute

Land development impacts on private sector employment, housing, and land values are investigated in order to provide local governments with inexpensive methods for estimating these impacts on the demand for housing and employment.

#### Findings

- o Property value changes must be considered at the neighborhood level.
- o The use of land use and other models has only limited success. Interviews and surveys provide information more efficiently for the same dollar amount.
- o While property values can be independently evaluated of employment, income, and housing, it is preferable to include these analyses as part of a broader economic impact study.

\* \* \* \* \*

## PROPERTY VALUES

\_\_\_\_\_, "Property Prices and Rents," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978 Available:NTIS (PB 292 401/AS)

Multiple regression analyses were carried out for eight study sites to determine BART's impacts on residential and commercial property prices and rents. Information from key informants was also used.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

Skaburskis, Andrys, "The Impact of BART on Property Values - A Case Study of the Rockridge Neighborhood," Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 367/AS)

Describes BART's impact on the sale price of single-family houses in Rockridge neighborhood in Oakland. Four specifications of an econometric model are discussed. Before-after, cross-sectional, and cross-sectional-longitudinal approaches are evaluated.

\* \* \* \* \*

\_\_\_\_\_, "The Distribution of the Tax Burden of Financing BART's Construction and Operations," McDonald & Greffe, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 282 990/AS)

The report identifies the sources of BART's capital financing and assigns the burden of each revenue source geographically as well as to economic sectors. The equity of BART's financing methods is evaluated.

\* \* \* \* \*

\_\_\_\_\_, "Study of BART's Construction Impacts," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, San Francisco, CA, 1978. Available: NTIS (PB 288 653/AS)

The report is an examination of the effects of BART's construction activities on retail sales and services and on real property. Key informant interviews were supplemented by longitudinal data on taxable retain sales and on permits for construction in areas near BART.

\* \* \* \* \*

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

#### Methodology

1. Statistical analyses were performed on housing sales data.
2. Local records were studied for housing data.
3. Comparative studies, case studies, and tests of hypotheses were used to monitor changes in commercial property.

#### Findings

- o All station areas have experienced housing sale price increases.
- o Some land value appreciation was noted.

\* \* \* \* \*

## RESIDENTIAL LAND USE

Appleyard, Donald and Frances Carp., BART Residential Impact Study - Station and Channel Typology, Institute of Urban and Regional Development, University of California, Berkeley, California, August 1972.

The Typology studies BART's impact on residential environments using the physical characteristics of BART and the physical/socio-economic characteristics of neighborhoods. The BART descriptors range from type of roadbed to degree of landscaping. The neighborhood is characterized by age-race-ethnic variables as well as housing quality and value. Thirty-four station locations are surveyed.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Methodology

1. To assess BART's impacts on regional growth, employment shifts in 66 Bay Area industry groups were compared with other large cities.
2. Workers in San Francisco who had recently changed jobs were surveyed.
3. Nine areas were studied for indications of residential construction.
4. A housing location survey was performed.

#### Findings

- o BART has not had a noticeable effect on housing starts in station areas.
- o The number of authorized residential units increased in only two areas.
- o Housing development related to BART has generally occurred beyond the immediate station areas.
- o Residential development along BART trackway has been adversely influenced by BART-generated noise.
- o BART's influence on housing construction has been less pronounced than its influence on office construction.

\* \* \* \* \*

Dunphy, Robert T., Trends Before Metrorail, Metropolitan Washington Council of Governments and Office of Planning Assistance, UMTA. Washington, D. C., July 1982. Available: DOT Office of Technology and Planning Assistance.

This report describes trends before the opening of the Metrorail transit system.

### Findings

- o Residential building activity has declined each year since 1977. Approximately one of every five higher density dwelling units was authorized for construction in Metrorail station areas.

\* \* \* \* \*

\_\_\_\_\_, Environmental Assessment: Economic Impacts, Skidmore, Owings & Merrill, U.S. DOT, Washington, D. C., 1975, Available: U.S. Government Printing Office.

The transportation planning process is evaluated in terms of its economic impacts. Subject areas covered include employment, income and business activity; residential activity; effects on property taxes, regional and community plans and growth, and resources.

\* \* \* \* \*

\_\_\_\_\_, "Land Use and Urban Development Project: Study of the Housing Industry," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB288 676/AS)

Addresses BART's effects on the housing industry in nine areas: Daly City-Pacifica, Mission District, Fruitvale, Walnut Creek, Hayward, Fremont-Union City, Pittsburg-Antroch, Richmond, and East Oakland. Changes in housing supply and demand during the period 1962-76 are analyzed.

\* \* \* \* \*

\_\_\_\_\_, MARTA Residential Displacement and Relocation Activity August 1973 - March 1978, Atlanta Regional Commission, Atlanta, GA, 1979. Staff Working Paper

Findings from a study conducted by the A.R.C staff on relocation activity and residential development resulting from the first phase of MARTA construction are presented. Displaced households representing selected socioeconomic characteristic are identified and evaluated as to the impacts of MARTA construction. Emphases is placed in quantifiable physical and economic impacts.

\* \* \* \* \*

Muller, Thomas, Economic Impacts of Land Development: Employment, Housing, and Property Values, The Urban Institute, Washington, D. C., September, 1976. Available: The Urban Institute

Land development impacts on private sector employment, housing, and land values are investigated in order to provide local governments with inexpensive methods for estimating these impacts on the demand for housing and employment.

\* \* \* \* \*

\_\_\_\_\_, "Program-Wide Case Studies," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 291 388/AS)

In-depth, policy-oriented case studies of BART's impacts on selected communities-downtown San Francisco and Oakland, representing urban core areas: The Mission District of San Francisco, the Rockridge neighborhood in Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, representing suburban areas.

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

Studholme, Edward D, METRO Impact in Arlington County: A Case Study and Evaluation of a Transit Growth Model, Urban Transportation Center, Washington, D. C., June 1971. Available: NTIS (PB 204 934)

Arlington County's response to the coming of the Washington METRO rapid transit system is evaluated by looking at deliberate public policy intervention aimed at coercing and/or inducing specific types of development around transit stations. The two parts of this study include the evaluation of a new transit growth model evaluated in terms of the major constraints which influence the planning and implementation processes, then in terms of its impact on the tax base of the community.

### Findings

- o As development intensity increases, the need for more carefully controlling private development also increases.
- o Developmental control must go beyond legal tools.

\* \* \* \* \*

## RESIDENTIAL LAND USE

---

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

Methodology

1. Housing sales data was gathered for each station area.
2. A statistical analysis was performed on housing sales data.
3. Rental apartment data was collected.

Findings

- o There were fewer housing sales in 1979 than in previous years.

\* \* \* \* \*

---

, Transit Impact Monitoring Program: Residential Land Monitoring, Atlanta Regional Commission, December 1978.

Activity related to residential property around the MARTA rail transit system is presented in two sections: Monitoring Changes and Measuring Impacts: An Overview, and Data Sheets. The first section outlines some of the concepts and hypothesis discussed in the transit impact literature, as well as a sketch of some of the methodological approaches to measuring and testing for impact. The Data Sheets presents findings for each of the Thirty transit station monitoring areas.

\* \* \* \* \*

## SAFETY

Graff, Donald L. and Robert L. Knight, Environmental Impacts of BART: Final Report, Gruen Associates, Inc., and DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118085)

The study consisted of a detailed assessment of BART's current environmental impacts, including direct impacts as well as indirect impacts and the effects on the system's patrons. Assessment was made using both technical impact evaluations and surveys of the responses of those affected. In addition, indications of BART's construction impacts and future impacts associated with the system's full-service level of operations are described and evaluated.

### Methodology

1. Direct observation and technical system evaluation.
2. Review of records and other historical data.
3. Interviews with BART personnel and users.
4. Review of environmental project's impact findings.

### Findings

- o The system's security and travel comfort are far superior to most other rapid transit systems.
- o Security is usually not a concern for patrons leaving their autos.
- o Automobile-related crime, such as breakins and thefts, are more frequent and increasing.
- o BART interiors are usually striking and safe areas.
- o Accidents in station concourses are rare.
- o Crime in BART stations is rare.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality of life.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

\_\_\_\_\_, Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

Methodology

1. A four step impact assessment process is introduced: inventory of previous work efforts, classification of relevant material, evaluation, and synthesis for the final product.

\* \* \* \* \*

## SOCIAL IMPACTS

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107 674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

Findings

- o BART offers savings over automobiles.
- o Residents near BART lines view BART impacts as favorable.
- o Noise from BART trains is perceived as a problem.
- o Residential neighborhoods around BART stations have experienced negative impacts due to increased traffic.
- o BART operations are relatively pollution-free and energy efficient.
- o Commuters have experienced only minor life style impacts.
- o Children and young people have increased mobility.
- o Elderly and handicapped have some increased mobility.

\* \* \* \* \*

Buffington, Jesse L., et al., Non-User Impacts of Different Highway Designs as Measured by Land Use and Land Value Changes, Texas Transportation Institute, College Station, Texas, March 1978. Available: NTIS (PB 288 875/8GA)

This report contains a review of types of higher impacts, impact assessment elements, techniques available to measure land use and land value impacts and the findings of previous studies.

Methodology

1. A literature review concerning the impact of highway improvements on land use and land value.
2. A review of existing impact assessment techniques was conducted.

\* \* \* \* \*

Chirstensen, Kathleen, Social Impacts of Land Development: An Initial Approach for Estimating Impacts on Neighborhood Usages and Perceptions. The Urban Institute, Washington D. C., 1976. Available: The Urban Institute.

The impacts of proposed development on the social character of a neighborhood are assessed from a community viewpoint. Techniques for conducting social impact evaluation are presented to determine the following: public recreational area usage., safe play areas for children, local grocery store accessibility and resident perception of neighborhood quality.

#### Methodology

1. Proxy measures are suggested for measuring the social impacts of the physical changes resulting from development.
2. Case study descriptions are a method for measuring qualitative changes.
3. Comparitive studies are useful for two similar project areas.

\* \* \* \* \*

\_\_\_\_\_, "Community Monitoring of the Environmental Impacts of BART," Curtis Associates and Gruen Associates, Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 369/AS)

A study which employed a variety of non-random, qualitative techniques to gain information on the general nature of community concerns for and responses to BART. This information served to verify that the major physical impacts perceived by the persons affected were being studied.

\* \* \* \* \*

\_\_\_\_\_, "Development Patterns," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NRTIS (PB 289 704/AS)

BART's effects on Bay Area, corridor and station area land use are examined. The techniques utilized are regional regression analyses of BART's influence on population, housing and employment; statistical analyses of survey results; and key informant interviews.

\* \* \* \* \*

## SOCIAL IMPACTS

, Environmental Assessment Handbook: Social Impacts, Skidmore, Owings and Merrill, U.S. DOT, WASHINGTON, D. C., 1975. Available: U.S. Government Printing Office. Stock #050-000-00109-1

The social impacts relating to the transportation planning process are discussed under the topics of community cohesion, accessibility of facilities and services, and the displacement of people.

\* \* \* \* \*

Manheim, Marvin L., et al., Transportation Decision Making: A Guide to Social and Environmental Considerations, National Cooperative Highway Research Program Report 156, Transportation Research Board, Washington, D. C., 1975. Available: Transportation Research Board

An integrated approach for systematically incorporated, social, economic, and environmental factors into transportation planning and design is presented. The approach is described using specific techniques and case examples. Procedural guidelines, management and policy guidelines, and implementation and application experience are outlined.

\* \* \* \* \*

Minkus, David, Impacts of BART on Bay Area Institutions and Life Styles, Jefferson Associates, Inc., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118127)

This report focuses on the effects of BART on the social institutions and life styles of Bay Area residents. It is the Final Report of the Institutions and Life Styles Project. The impacts on three primary institutional spheres are evaluated: local political institutions, including community responses to BART, institutions of higher education and their students, and health care institutions and their clients. Case studies designed to assess BART-related changes in organizational activities and in the social experience and expectations of the participants are described. The study of life style impacts was focused on the direct and indirect impact of BART on the use and experience of a variety of transportation modes, as well as on household routines, commuters' experiences, and the family as an institution.

#### Methodology

1. Issue identification by short, focused interviews was the study approach.
2. Follow up in-depth case studies of BART user households and of social institutions were conducted.

#### Findings

- o BART is viewed as a time saver when it runs without mishap.
- o BART is a quiet space for transition from the work world to home.
- o BART appears to stimulate travel for transit dependent household.
- o Recreational trips are the most frequent BART use.
- o Lack of human contact and automation bother some riders.

\* \* \* \* \*

\_\_\_\_\_, "Program-Wide Case Studies," John Blayney Associates/David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, 1978. Available: NTIS (PB 291 388/AS)

In-depth, policy-oriented case studies of BART's impacts on selected communities-downtown San Francisco and OAKLAND, representing urban core areas: The Mission District of San Francisco, the Rockridge neighborhood in Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, representing suburban areas.

\* \* \* \* \*

## SOCIAL IMPACTS

\_\_\_\_\_, "Responses of Nearby Residents to BART's Environmental Impacts,"  
DeLeuw, Cather & Co., Metropolitan Transportation Commission, 1977.  
Available: NTIS (PB 280 202/AS)

Data analysis are from a home interview survey of some 700 persons living in ten case study sites, most within four blocks of the tracks or station parking lots. Perceptions, evaluations and behavioral responses reported by residents are compared with the study's earlier impact assessments made by staff.

\* \* \* \* \*

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

Skaburskis, Andrys, "The Impact of BART on Property Values - A Case Study of the Rockridge Neighborhood," Metropolitan Transportation Commission, 1976. Available: NTIS (PB 258 367/AS)

Describes BART's impact on the sale price of single-family houses in Rockridge neighborhood in Oakland. Four specifications of an econometric model are discussed. Before-after, cross-sectional, and cross-sectional-longitudinal approaches are evaluated.

\* \* \* \* \*

\_\_\_\_\_, "Social Impacts of BART on Bay Area Families and Life Styles," Jefferson Associates, Inc., Metropolitan Transportation Commission, 1977. Available: NTIS (PB 286 509/AS)

Describes the impacts of BART on families and the life styles of BART users. The impacts are evaluated in nine dimensions of life style routines. Policy implications of the research findings are included.

\* \* \* \* \*

## SOCIAL IMPACTS

          , Transportation Facility Proximity Impact Assessment, Booz, Allen & Hamilton, U.S. DOT, Washington, D. C., March 1976. Available: NTIS (PB 264 160/AS)

Provides techniques for assessing transportation facilities impacts. A two-stage evaluation process is developed for noise, air quality, traffic volume, accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community description impacts.

Methodology

1. A four step impact assessment process is introduced: inventory of previous work efforts, classification of relevant material, evaluation, and synthesis for the final product.

\* \* \* \* \*

## SPECULATION

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107 674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

Methodology

1. Data on property turnover, owner occupancy, zoning variance requests, and use conversions were analyzed.
2. 41 interviews were conducted.

Findings

- o Speculation related to BART has not been a major event around station areas.
- o Speculation tended to be on small commercial and residential properties.
- o No instances of noticeable impact on land use has been observed.
- o Most speculation occurred in the 1960's when expectations about BART were highest.

\* \* \* \* \*

## SPECULATION

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118 135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

Methodology

1. Eight BART station areas were investigated for evidence of speculation.
2. Interviews were conducted with real estate specialists and local officials.
3. Data was gathered on factors indicating a potential of speculative activity.

Findings

- o Indications of speculation was found at five of the eight areas studies.
- o No instance of speculation involved large-scale purchase or holding of land.
- o The level and type of speculation varied considerably.

\* \* \* \* \*

---

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

Methodology

1. A set of hypotheses were developed to test specific impacts.

\* \* \* \* \*

## SPECULATION

, Transit Impact Monitoring Program, 1978 Commercial Land Impacts,  
Atlanta Regional Commission Regional Development Planning, Atlanta,  
GA, 1978.

The report provides a brief analyses and summary of MARTA acquisitions of commercial sites from 1974 to 1978, and a station area summary of all commercial property sales that were recorded in the 39 MARTA station areas during the years 1972 to 1974 and over the first six months of 1978.

Methodology

1. Sales data was compared with the type of station.
2. Stations were classified according to development policies.

Findings

- o At least five stations have had either increased sales activiey, price bid-ups, or property assemblage.
- o Most investors have a "wait and see" attitude towards development in station areas.
- o Property assemblage in anticipation of MARTA is not occurring.
- o Speculation is not evident.

\* \* \* \* \*

## TERMINAL LOCATION

Appleyard, Donald and Frances Carp., BART Residential Impact Study - Station and Channel Typology, Institute of Urban and Regional Development, University of California, Berkeley, California, August 1972.

The Typology studies BART's impact on residential environments using the physical characteristics of BART and the physical/socio-economic characteristics of neighborhoods. The BART descriptors range from type of roadbed to degree of landscaping. The neighborhood is characterized by age-race-ethnic variables as well as housing quality and value. Thirty-four station locations are surveyed.

\* \* \* \* \*

, Development Suitability of Environmentally Sensitive Areas Around the Rapid Transit System, Atlanta Regional Commission, U.S. DOT, Washington, D. C., June 1975.

Staff working paper. The analysis method measured slope, soil type and vegetation for each specific site. The objective was not to solve specific environmental problems but to analyze the ability of the site to sustain development. The study analyzed 10 sites in Atlanta.

#### Methodology

1. Graphic overlays were used to test sites for their development potential.
2. A generalized inventory procedure was used.

\* \* \* \* \*

## TERMINAL LOCATION

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayney Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

Methodology

1. The BART Real Estate Department provided information on land acquisition, relocation assistance, and development of surplus properties.
2. Supplementary information was obtained from interviews.

Findings

- o Generally, BART's consumption of land and property for the new system has not been disruptive.
- o The most severe impacts occurred in areas of cut and coverage construction.
- o BART's policies for disposal of surplus properties has generally been successful.

\* \* \* \* \*

---

, Exhibiting Jurisdictions: Community Profiles and Site Marketing Information, Urban Consortium for Technology In, U.S. DOT, Washington, D. C., July 1980. Available: Public Technology, Inc.

Community profiles of nearly one hundred sites are the focus of this document. Marketing information on these sites is given for the purpose of making the private sector aware of development sites that are closely linked to existing or proposed public transportation facilities. It institutes the types of properties which may be available for transit terminals.

\* \* \* \* \*

---

, MARTA Residential Displacement and Relocation Activity August 1973 March 1978, Atlanta Regional Commission, Atlanta, GA, 1979.. Staff working Paper.

Findings from a study conducted by the A.R.C staff on relocation activity and residential development resulting from the first phase of MARTA construction are presented. Displaced households representing selected socioeconomic characteristic are identified and evaluated as to the impacts of MARTA construction. Emphases is placed in quantifiable physical and economic impacts.

\* \* \* \* \*

## TERMINAL LOCATION

Schneider, J. B., et al., Planning and Designing a Transit Center Based Transit System: Guidelines and Examples from Case Studies in Twenty-Two Cities, University of Washington, U.S. DOT, Washington, D. C., September 1980. Available: NTIS (PB81-154569)

The transit center concept is examined to determine if and how it might be applied in American cities to provide more efficient and effective transit service on an areawide basis. Present metropolitan travel patterns in American cities are studied, followed by a 10 step planning framework.

Findings

- o Every transit center should be located within or adjacent to a regional activity center.
- o An off street site is highly recommended.

\* \* \* \* \*

Schneider, Jerry B., Transit and the Polycentric City, University of Washington, U.S. DOT, Washington, D. C., September 1981. Available: GPO Stock # 050-000-00203-9

Investigated is the role of transit in carrying out regional land use plans aimed at creating major diversified centers in the outer city. The regional planning work in the Twin Cities of Minnesota and other U.S. cities is used to define the polycentric city concept. And evaluation framework is developed and applied.

Findings

- o Surveys show that the polycentric city concept is widely used by metropolitan planning agencies, but superficially.
- o Outer city center creation is important for the areawide non rail transit to be viable.
- o A coordinated effort between federal and local interests in needed.

\* \* \* \* \*

## TERMINAL LOCATION

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, Atlanta, GA., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

Methodology

1. Travel time, on-board, workplace, telephone, traffic count, and station area surveys were conducted.
2. An analysis was done on MARTA operations, network analysis, residential attitudes, MARTA relocations, station and plan implementation, residential land activity, and commercial land activity.

Findings

- o The majority of residents felt the new transit stations blended well into their community.
- o Residents felt that MARTA had been attuned to their needs.
- o Residents felt that the negative impacts associated with line construction were worth it.
- o 61% of businesses reported increased income.
- o Businesses closer to station entrances generally showed greater increase in sales volume.

\* \* \* \* \*

, Transit Impact Monitoring Program: Public Improvements in Station Areas, Atlanta Regional Commission, Atlanta Ga., December 1978.

The various public capital improvements proposed to be constructed in relationship to the MARTA system are cataloged and updated to provide the status of individual projects, whether completed, under construction, or still planned for future construction.

\* \* \* \* \*

## TERMINAL LOCATION

, Transit Impact Monitoring Program: Residential Land Monitoring,  
Atlanta Regional Commission, Atlanta, GA., December 1978.

Activity related to residential property around the MARTA rail transit system is presented in two sections: Monitoring Changes and Measuring Impacts: An Overview, and Data Sheets. The first section outlines some of the concepts and hypothesis discussed of some of the methodological approaches to measuring and testing for impact. The Data Sheets presents finding for each of the thirty transit station monitoring areas.

Methodology

1. Case studies of sample parcels traced over a specified time period.
2. Corridor studies of a large sample size are compared with other large samples.

\* \* \* \* \*

, Transit Station Area Development Studies Summary, Atlanta Regional  
Commission, Atlanta, GA., September 1977.

Slope, soils and vegetation properties of 10 specific sites were analyzed to determine developmental potential. The objective of this analysis is not to solve specific environmental problems but to determine the ability of these sites to sustain varying land uses and densities.

\* \* \* \* \*

## TRAVEL IMPACTS

\_\_\_\_\_, "Accessibility Mapping," John Blayney Associates, David M. Dornbusch & Co., Inc., Metropolitan Transportation Commission, San Francisco, CA, 1977.

Auto access times to selected BART stations are mapped and compared with the frequency distribution of travel times to BART reported in the Passenger Profile Survey. The maps and accessibility measures were used in analyzing BART's effects on office construction and the housing industry, workplace and residence location decisions, retail sales trends, property values and rents, and other facets of urban development.

\* \* \* \* \*

\_\_\_\_\_, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Findings

- o BART mainly attracts riders with destinations close to stations.
- o Riders are attracted because of travel time savings over buses, cost savings over autos, and parking advantages.

\* \* \* \* \*

## TRAVEL IMPACTS

Donnelly, Paget, Rail Transit Impact Studies: Atlanta, Washington, San Diego, Price, Williams, and Associates, Office of Planning Assistance, U.M.T.A, Washington, D. C., March 1982.

The study assess the change in travel behavior which result from a major transportation system and develops information to aid future investment decisions.

Findings

- o Changes in total transit ridership varied with the size of the line segment opened and with the extent to which new markets for transit were penetrated.
- o Rail systems ridership has been drawn primarily from former bus patronage.
- o Most heavy rail systems are used for work-oriented travel; Washington 70 percent and Atlanta 80 percent. However, San Diego system only experienced a 40 percent work-oriented travel.
- o Most users arrive at rail stations by bus during the morning peak.
- o Trips on rail tend to be concentrated and centrally oriented.
- o Travel changes has been characterized more by increased transit use than by reduction of auto use or congestion.
- o User travel time and cost changes were strongly related to the specific trip origin or destination.

\* \* \* \* \*

## TRAVEL IMPACTS

Dunphy, Robert T. and Robert E. Griffiths, The First Four Years of Metrorail: Travel Changes, The Metropolitan Washington Council of Governments, Washington, D. C., September, 1981. Available: Metropolitan Information Center of the Metropolitan Council of Government.

This report describes travel pattern changes, and provides an analysis of rider characteristics and the effects of rapid transit on suburban employment.

Methodology

1. Separate analyses were conducted according to the opening of each phase.
2. Interviews were conducted with travelers, developers, and employers about changes caused by Metrorail.
3. Statistical techniques were used to test relationships using mathematical techniques.
4. A "before and after" model and a "control area" model were also used.

Findings

- o The 31 stations in use had different times of heaviest use, indicating different trip purposes.
- o Average reported commuting time to jobs in the CBD did not noticeably change for the primary modes.
- o Those commuters using sub-modes did realize some travel time savings.
- o The majority of daily arrivals at the 24 stations occurred during the morning and evening peak periods.
- o Evening peak stations served mainly workers.
- o The morning-peak dominant stations served residents mainly.
- o After the opening of Metrorail, arrival time dispersion during peak periods increased.

\* \* \* \* \*

## TRAVEL IMPACTS

Dyett, Michael, et al., Land Use and Urban Development Impacts of BART: Final Report, John Blayne Associates/David M. Dornbush & Co., U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTRIS (PB81-118135)

How and to what extent BART has influenced the land use patterns of the Bay Area is documented. Area examined are household's and worker's location decision, development decision, retail and shopping patterns and property value and rents.

Methodology

1. Areawide accessibility changes were measured using a comparison of BART and NBA travel time between the 184 zones.
2. A computer coded highway and transit network analysis was used.

Findings

- o Mobility changes have yet to be realized.
- o BART's land use impacts to date have been small.
- o Those considering similar rail improvements should not expect marked changes in urban development patterns unless accessibility gains are demonstrated by actual increased ridership.

\* \* \* \* \*

## TRAVEL IMPACTS

Paaswell, Robert E., An Analysis of Rapid Transit Investment: Final Report, Research Foundation of the State University of New York, for U.S. DOT, Washington, D. C., July, 1981. Available: NTIS (PB81-107674)

The study addresses the following: a definition of the nature of the transit investment and private sector response, a determination of conflicting or reinforcing policies for transit investment, an application of analytical techniques to measure the impact of the investment strategies, and a case study of Central Business District revitalization in Buffalo, New York.

#### Methodology

1. An accessibility model (ACCESS) was used to measure the change in total accessibility within the Buffalo area by zone.
2. The model is a derivative of Davidson's accessibility model.
3. The other models used include a shopping probability model and an urban activity model (GLMOD).
4. Two surveys were also conducted.

#### Findings

- o Rapid transit systems must be implemented in areas with demonstrable growth potential.
- o Large capital rail investments have far reaching effects on the areas around it.
- o A new transit system installation in a declining central city can have positive impact for revitalization.
- o Major differences exist in zone accessibility when trip purpose is work vs service.
- o Travel times regionally are short and are linked more to highway than transit use.
- o Time and total accessibility will only moderately change due to the new LRRT system.

\* \* \* \* \*

## TRAVEL IMPACTS

Schaenman, Philip S. and Thomas Muller, Measuring Impacts of Land Development: An Initial Approach, The Urban Institute, Washington, D. C., 1974. Available: The Urban Institute.

This report employs a system of impact measures to be used by local officials and citizens for assessing the effects of land development proposals.

\* \* \* \* \*

Sherret, Alistair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

#### Findings

- o The predominant use of BART is for long-distance commuting.
- o Heaviest BART users are white-color commuters.
- o The impact of BART on travel patterns is less than anticipated.
- o Actual ridership falls short of projected ridership.

\* \* \* \* \*

, Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

#### Methodology

1. Travel time, on-board, workplace, telephone, traffic count, and station area surveys were conducted.
2. An analysis was done on MARTA operations, network analysis, residential attitudes, MARTA relocations, station and plan implementation, residential land activity, and commercial land activity.

\* \* \* \* \*

## TRAVEL IMPACTS

, Trends Before the San Diego Trolley: A San Deigo Trolley Guideway Implementation Monitoring Study Report, by San Deigo Association of Governments for the Office of Planning Assistance, UMTA, Washington, D. C., July 1982. Available: San Diego Association of Governments.

This report contains a general description of the San Diego Area and San Diego Trolley. The transportation, land use, economic and social characteristics of the area served by the San Diego Trolley are presented.

Findings

- o San Deigo County contains over 4,200 square miles.
- o The 1980 regional population was 1.86 million with a population density of 450 persons/sq. miles.
- o Diversified economy of 750,000 jobs - 17% military; 14% manufacturing and 21% tourist related.
- o Patronage forecasts are 28,000 to 30,00 by 1995.
- o Trip purpose distribution: 37% - 42% home to work; of these, 15% are border-crossings.
- o Relative low peak hour (10%) reflects the all-day distribution of border-crossings.

\* \* \* \* \*

, BART in the San Francisco Bay Area - The Final Report of the BART Impact Program, Metropolitan Transportation Commission, U. S. DOT, Washington, D. C., June 1979. Available: NTIS (PB81-107674)

The final report of the BART Impact Program, analyzing the impacts of the BART system, aims to guide future transportation planning and policy decisions in the Bay Area and in other urban areas. The effects of BART on the Bay Area's transportation systems and travel behavior, the environment, economics and finance, institutions and life styles, land use and urban development, and public policy were assessed.

#### Findings

- o BART has increased travel capacities and travel in the constrained corridors it serves.
- o BART is serving a large proportion of the trips it was designed to serve.
- o Community support for the project is important for avoiding conflict.
- o Supportive public policy can help shift demand into station areas.

\* \* \* \* \*

## USER CHARACTERISTICS

Donnelly, Robert and Jesus Arguelles, Implications of BART's Impacts for the Transportation Disadvantage, Urban Dynamics Associates/U.S. DOT/U.S. HUD, Washington, D. C., April 1979. Available: NTIS (PB81-118101)

The project examined the implications of the impact of BART on ethnic minorities, elderly and handicapped. Impact areas examined are environmental, mobility economic and land use.

Methodology

1. Twenty-three issue statements concerning BART's impacts on the transportation disadvantaged were tested as hypotheses.
2. The six project areas of the BART Impact Program, other BART studies, and primary data sources were referenced.

Findings

- o Environmental impacts have been negligible for the transportation disadvantaged.
- o Two negative environmental impacts are station area traffic and increased noise levels.
- o Negative impacts are more intense in suburban, non-minority areas.
- o Mobility for the transportation disadvantaged has has been relatively unaffected.
- o Conventional bus transit is still heavily used by the transportation disadvantaged.
- o Service area determination is of critical importance to the transportation disadvantaged.

\* \* \* \* \*

## USER CHARACTERISTICS

Dunphy, Robert T. and Robert E. Griffiths, The First Four Years of Metrorail: Travel Changes, The Metropolitan Washington Council of Governments, Washington, D. C., September, 1981. Available: Metropolitan Information Center of the Metropolitan Council of Government, and U.S. DOT Office of Technology and Planning Assistance.

This report describes travel pattern changes, and provides an analysis of rider characteristics and the effects of rapid transit on suburban employment.

Methodology

1. Separate analyses were conducted according to the opening of each phase.
2. Interviews were conducted with travelers, developers, and employers about changes caused by Metrorail.
3. Statistical techniques were used to test relationships using mathematical techniques.
4. A "before and after" model and a "control area" model were also used.

Findings

- o Ridership growth projections were consistently exceeded.
- o There was a reduction in the number of regional transit riders using buses.
- o A significant shift occurred in the orientation of bus passengers.

\* \* \* \* \*

---

, MARTA Residential Displacement and Relocation Activity August 1973 - March 1978, Atlanta Regional Commission, Atlanta, GA, 1979.. Staff Working Paper

Findings from a study conducted by the A.R.C staff on relocation activity and residential development resulting from the first phase of MARTA construction are presented. Displaced households representing selected socioeconomic characteristic are identified and evaluated as to the impacts of MARTA construction. Emphases is placed in quantifiable physical and economic impacts.

\* \* \* \* \*

## USER CHARACTERISTICS

Minkus, David, Impacts of BART on Bay Area Institutions and Life Styles, Jefferson Associates, Inc., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118127)

This report focuses on the effects of BART on the social institutions and life styles of Bay Area residents. It is the Final Report of the Institutions and Life Styles Project. The impacts on three primary institutional spheres are evaluated: local political institutions, including community responses to BART, institutions of higher education and their students, and health care institutions and their clients. Case studies designed to assess BART-related changes in organizational activities and in the social experience and expectations of the participants are described. The study of life style impacts was focused on the direct and indirect impact of BART on the use and experience of a variety of transportation modes, as well as on household routines, commuters' experiences, and the family as an institution.

### Methodology

1. Case studies approach was used to identify different types of BART users.
2. Contact interviews, an observational census, and survey data were used in the analysis.

### Findings

- o Work commuters to white-collar work centers benefit financially and psychologically from BART.
- o Transit-dependent riders suffer from limited off-peak service and nonexistent weekend service when the study was completed.
- o BART's high-quality interior environment has encouraged patronage.
- o Most users of BART view it as substantially different from bus service.

\* \* \* \* \*

Sherret, Alistair, BART's First Five Years: Transportation and Travel Impacts, Peat, Marwick, Mitchell & Co., U.S. DOT, Washington, D. C., April 1979. Available: NTIS (PB81-118077)

The BART System, its costs, the service it provides relative to bus and automobile, and the nature of its ridership are described. BART's impacts on modal split, bus ridership and service, and highway traffic and congestion are analyzed; and implications for planning rail transit elsewhere are drawn.

#### Findings

- o The predominant use of BART is for long-distance commuting.
- o Heaviest BART users are white-color commuters.
- o The impact of BART on travel patterns is less than anticipated.
- o Actual ridership falls short of projected ridership.

\* \* \* \* \*

## USER CHARACTERISTICS

          , Transit Impact Monitoring Program: Annual Report 1980, Atlanta Regional Commission, U.S. DOT, Washington, D. C., December 1980.

This annual report is intended to measure, analyze, and evaluate the various transportation and land use impacts of the construction and operation of MARTA rail transit service in the Atlanta region. Highlights of the progress and findings for the fourth year of the monitoring program are presented.

### Methodology

1. Travel time, on-board, workplace, telephone, traffic count, and station area surveys were conducted.
2. An alysis was done on MARTA operations, network analysis, residential attitudes, MARTA relocations, station are plan implementation, residential land activity and commercial land activity.
3. Activity center case studies were presented.
4. Computer graphics capability was developed.

### Findings

- o Black and white respondents to the on board survey vary in trip purpose and auto availability.
- o The opening of rail stations had no impact on neighborhood parking in the surrounding area.
- o Parking lot use varied from over to under capacity use.
- o Most residents felt the transit stations blended into their community.

\* \* \* \* \*

## USER CHARACTERISTICS

, Trends Before the San Diego Trolley: A San Deigo Trolley Guideway Implementation Monitoring Study Report, by San Deigo Association of Governments for the Office of Planning Assistance, UMTA, Washington, D. C., July 1982. Available: San Diego Association of Governments.

This report contains a general description of the San Diego Area and San Diego Trolley. The transportation, land use, economic and social characteristics of the area served by the San Diego Trolley are presented.

Findings

- o San Deigo County contains over 4,200 square miles.
- o The 1980 regional population was 1.86 million with a population density of 450 persons/sq. miles.
- o Diversified economy of 750,000 jobs - 17% military; 14% manufacturing and 21% tourist related.
- o Patronage forecasta are 28,000 to 30,00 by 1995.
- o Trip purpose distribution: 37% - 42% home - work; of these, 15% are border-crossings.
- o Relative low peak hour (10%) reflects the all-day distribution of border-crossings.
- o Total cost \$122,000,000.
- o Existing 1980 travel characteristics:

Auto daily trip region 8,000,000

Transit daily trips corridor 40,100

\* \* \* \* \*

## USER COST

\_\_\_\_\_, "A Description of BART: Its Facilities, Service and Surroundings," Gruen Associates, Metropolitan Transportation Commission, San Francisco, CA, 1977. Available: NTIS (PB 287 338/AS)

This report describes the BART System, its operations, costs, and ridership. Characteristics of the population, employment, and land uses in the nine-county Bay Area are also describe.

\* \* \* \* \*

Baum, H. and W. Kentner, Tariff Policies for Urban Transport, European Conference of Ministers of Transport, Report of the Forty-Sixth Round Table on Transport Economics, Paris, March, 1979. Available: Organization for Economic Co-Operation and Development.

This reort presents arguments for and against subsidizing public transport. Short and long term needs are addressed by looking at assessment criteria for tariff policy, tariff policy alternatives, tariff policy for private transport, and recommendations on future tariff policies.

#### Findings

- o Arguments for and against subsidizing transit need careful monitoring.
- o Fixing the overall level of external finance in advance is preferable to posthumously covering losses.
- o Modal split policy should be coupled with a policy for organizing time such as smoothing out peaks.
- o Some serious mistakes have been made regarding parking facilities; these policies should be reviewed.

\* \* \* \* \*

\_\_\_\_\_, Environmental Impacts of BART: The User's Experience," DeLeuw, Cather & Co., Metropolitan Representation Commission, 1979. Available: NTIS (PB 280 200/AS)

A study of the BART travel experience - the immediate effects of BART as an "environment" for its users. The BART trip is described as a process, following the user from the desire to take a trip to the completion of that trip and exit from the BART System. BART characteristics to be encountered at each stage of the trip are described and evaluated. Conclusions and implications for design of future transit systems are drawn.

\* \* \* \* \*

\_\_\_\_\_, Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office, Stock # 050-000-00163-6, \$9.00

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

### Findings

- o The price elasticity of demand for fare reductions to increase patronage enough to increase total revenues must be greater than 1.
- o Auto driver response to transit fare reductions have been small, making the cost of diversion per vehicle quite high.
- o Transit subsidies financed by state and local taxes are generally an inefficient way of channeling assistance to low income groups.

\* \* \* \* \*

## USER COST

, Light Rail Rapid Transit for Buffalo: Capital Cost, Ridership and Financial Projections: Interim Results, Niagara Frontier Transit Authority Metro Construction Division, Buffalo, New York, April 1978.

Preliminary forecasts for 1985 are presented for the ridership impacts of the proposed light rail rapid transit system for Buffalo, New York. Study elements include complementary bus network alternatives, person trip and distribution forecasts, a mode choice model, proposed fare policies, bus ridership forecasts, bus operating cost methodology and expense forecasts, transit operating financial forecasts, and interim 1985 station and line segment volume estimates.

### Methodology

1. 1985 socioeconomic forecasts are made using zone level forecasts prepared by NFTC.
2. Existing travel models are used to forecast person trip ends.
3. Two new travel models were developed.
4. Alternative feeder bus networks and fare policies were developed.

### Findings

- o The LRRT system would carry almost 80% more annual riders in 1995, and reduce the operating deficit per passenger almost 40% below that forecast for an improved bus system.
- o The NFT Metro will provide better service and attract more riders than buses.
- o A LRRT system appears to be in the best interests of the Niagara Frontier urban area.

\* \* \* \* \*

, Urban Public Transport: Evaluation of Performance, Organization for Economic Co-Operation and Development, Paris, France, 1980. Available: Organization for Economic Co-Operation and Development.

Designed to aid local officials, this study of evaluation methods and performance indicators assesses the options and strategies for urban transport operation and investment. Performance is evaluated regarding internal efficiency and community impact effectiveness.

#### Findings

- o Performance indicators should be used for evaluation of public transport.
- o Further attention should be given to transport systems and indicators, for all modes.

\* \* \* \* \*

## VALUE CAPTURE

          , Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office, Stock # 050-000-00155-5, \$9.00

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

Methodology

1. Uses "order or magnitude" numerical examples.
2. Rough calculations are used to gain some quantitative insight into the policy alternatives.
3. The magnitude of a proposed change is stressed, rather than its direction.

Findings

- o Transit acts to relocate development within the metropolitan area, rather than create new development.
- o Transit can have positive impacts on property values, especially adjacent to station stops.
- o It is difficult to isolate the impact of transit from other development factors.

\* \* \* \* \*

, Selected Value Capture Opportunities Related to the Rapid Transit System in Metropolitan Atlanta, Atlanta Regional Commission, May, 1978.

Staff working paper. The report introduces the concept of value capture, value capture techniques, and identifies value capture opportunities at selected MARTA stations. Issues associated with value capture and specific strategies are developed for selected MARTA stations.

#### Methodology

1. Station areas with very different characteristics were selected to evaluate the various value capture concepts and techniques.

#### Findings

- o Rapid transit systems should not be viewed solely as transportation improvements.
- o The benefits of rapid transit must account for social, human, and economic benefits as well as patronage benefits.
- o The MARTA system can be an essential aspect of economic, social, and cultural well-being for metro Atlanta residents.
- o Value capture can aid in achieving urban goals.

\* \* \* \* \*

Sharpe, Carl P., Value Capture and Joint Development Applications: Chicago, Louisville, Los Angeles, U.S. DOT, Washington, D. C., 1977.  
Available: NTIS (PB 272 512/5G1)

Value capture policy is evaluated using highlights of findings from previous work at Rice University, defines how value capture can be implemented, describes legal, financial, and community design issues associated with the value capture concept and summarizes the conclusions reached and the methodology employed in the research. Three case studies are included.

\* \* \* \* \*

## VALUE CAPTURE

, Financing Transit: Alternatives for Local Government, Institute of Public Administration, U.S. DOT, Washington, D. C., July 1979. Available: U. S. Government Printing Office, Stock #050-000-00163-6

This is a guide for local officials to gain familiarity with the financial issues facing mass transit systems, the institutions which provide financing for transit, and information for decision makers about transit financing and budgeting.

Findings

- o Only when aggregate gains exceed aggregate losses will there be an increase in the capital value of property and in property tax revenues.
- o If taxes are greater than anticipated, developers will suffer capital losses, if lower they will have windfall profits.
- o Special taxes on value increments that will not retard new building investment and improvements are needed for successful value capture.

\* \* \* \* \*

Environmental Assessment Handbook: Physical Impacts, Skidmore, Owings and Merrill, U. S. DOT, Washington, D. C., 1975. Available: U. S. Government Printing Office. Stock #050-000-00109-1

The physical impacts relating to the transportation planning process covered in this document are environmental design, aesthetics and historic values; aquatic ecosystems; air quality and noise vibration.

### Findings

- o For areas of potential harm to the terrestrial ecosystem, a series of measures are suggested as the least harmful approach to protect the environment. The topics reviewed for measures to minimize harm to the ecosystem include the following: right-of-way design, replacement/restoration, monetary compensation, planning assistance, regulatory, and technological.

\* \* \* \* \*

Keyes, Dale L., Land Development and the Natural Environment: Estimating Impacts. The Urban Institute, Washington, D. C., 1976. Available: The Urban Institute

The effects of land development on the natural environment are investigated. Both simple manual techniques and complex computerized procedures are examined for estimating land use impacts.

### Methodology

1. Open space was measured using aerial photos.
2. Vegetation quality and quantity was inventoried by using a quality rating scale and aerial photos and/or field surveys.
3. Wildlife was inventoried by population census or by assessing local habitat qualities.

### Findings

- o Considerations for individual development should include an evaluation of the expected change in the amount of vegetation and numbers of wild species.
- o Impact estimation must be based on analogies to similar case studies.
- o Project evaluations should be supplemented by data collected by local universities and private naturalist associations.
- o High quality natural areas and wildlife habitats should be identified.

\* \* \* \* \*

## ZONING

, Innovative Financing Techniques, Gladstone Associates, U.S. DOT, Washington, D. C., January, 1978. Available: U.S. Government Printing Office. Stock #050-000-00155-5

This report sets forth the range of innovative financing techniques, such a joint development, and their potential in terms of institutional feasibility. The magnitude of land use impacts are calculated to identify the most promising innovative techniques.

Methodology

1. A pro-forma financial analysis was made of the project for anticipated revenues, operating expenses, and improvement costs.
2. An order of magnitude estimate was developed to diminsion the financing potentials.

Findings

- o For incentive zoning to work, existing zoning should be restrictive, otherwise the developer will most likely choose conentional development.
- o If downzoning is required, political controversy is likely.
- o More planning and administrative expertise is required for incentive zoning than traditional zoning.
- o Generally, incentive zoning cannot normally finance transit directly.
- o Special district zoning can provide some direct financing for transit, as well as indirect financing.
- o The administrative resources for implementation of special district zoning are substantial.

\* \* \* \* \*

, Joint Development: Making the Real Estate Transit Connection, The Urban Land Institute, Washington, D. C., 1979. Available: The Urban Land Institute.

The report presents the joint development concept through several case studies of five areas. It is aimed at local officials, developers, and citizens for a view of how the joint development concept can be translated into practical, successful projects.

#### Findings

- o Sites where zonings has already been established for uses and densities appropriate to market demands provides the greatest attractor for private developers.
- o Conversely, improperly zoned sites discourage developers, especially when rezoning appears to be a long and uncertain process.
- o The case studies show both successful and unsuccessful demonstrations of land use coordination at the regional and metropolitan levels.

\* \* \* \* \*

Knight, Robert L. and Lisa L. Trygg, Land Use Impact of Rapid Transit: Implications of Recent Experience Executive Summary, DeLeuw, Cather & Company, U.S. DOT, Washington, D. C., December 1977. Available: NTIS (PB 287 190/3GA)

The focus centers on the economic/investment aspect of transportation projects and its relationships with the land-use transportation interaction phenomenon. The difficulty of introducing an economic investment variable into relevant models are examined. Supplementary policies to enforce and direct the operation of transportation investments is included.

#### Methodology

A historical, case study approach is used to determine the role of public land use policy in assessing transit station impacts.

#### Findings

- o In situations when zoning has been an incentive to land development, their power has depended on the degree of advantage provided for that station site versus one located elsewhere.
- o Occasionally land use policies have prevented development by prescribing low density land use, thereby precluding economic development.

\* \* \* \* \*

## ZONING

, Selected Value Capture Opportunities Related to the Rapid Transit System in Metropolitan Atlanta, Atlanta Regional Commission, May, 1978.

Staff working paper. The report introduces the concept of value capture, value capture techniques, and identifies value capture opportunities at selected MARTA stations. Issues associated with value capture and specific strategies are developed for selected MARTA stations.

Methodology

1. An illustrative approach is used to show concepts and techniques in an applied context.

Findings

- o Zoning ordinance floor area ratios should be set low to entice developers to provide the improvement and take the bonus.
- o The floor area ratio should be limited to avoid immense, out-of-scale structures.
- o The establishment of an incentive system raises complex problems and issues.
- o Cooperative management between the city and county is recommended for the establishment and administration of the incentive system.

\* \* \* \* \*

## Appendix

## Source of References

1. Transportation Research Board  
National Academy of Sciences  
2101 Constitution Avenue, N.W.  
Washington, D. C. 20418
2. National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161
3. Organization for Economic Co-Operation and Development  
OCED Publications and Information Center  
Suite 1207  
1750 Pennsylvania Avenue, N. W.  
Washington, D. C. 20006  
Telephone: (202)742-1857
4. U. S. Government Printing Office  
Washington, D. C. 20402  
Attn: Superintendent of Documents
5. Publications Office  
The Urban Institute  
2100 M. Street, N. W.  
Washington, D. C. 20037
6. Metropolitan Information Center  
Metropolitan Washington Council of Governments  
1875 Eye Street, N. W.  
Washington, D. C. 20006  
Telephone: (202)223-6800, Ext. 230
7. Public Technology, Inc.  
1301 Pennsylvania Ave., NW  
Washington, D. C. 20004  
Telephone: (202)626-2400
8. ULI - The Urban Land Institute  
1200 18th Street, N. W.  
Washington, D. C. 20036





## NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

This report is being distributed through the U.S. Department of Transportation's Technology Sharing Program.

DOT-I-83-53



DOT-I-83-53



# TECHNOLOGY SHARING

A PROGRAM OF THE U.S. DEPARTMENT OF TRANSPORTATION